



**Count on it.**

Form No. 3400-922 Rev B

# Operator's Manual

## **Z Master® Professional 5000 Series Riding Mower** with 48in TURBO FORCE® Side Discharge Mower

Model No. 74904—Serial No. 316000001 and Up



g027403



This spark ignition system complies with Canadian ICES-002.

It is a violation of California Public Resource Code Section 4442 or 4443 to use or operate the engine on any forest-covered, brush-covered, or grass-covered land unless the engine is equipped with a spark arrester, as defined in Section 4442, maintained in effective working order or the engine is constructed, equipped, and maintained for the prevention of fire.

## ⚠ WARNING

**Removing standard original equipment parts and accessories may alter the warranty, traction, and safety of the machine. Failure to use original Toro parts could cause serious injury or death. Making unauthorized changes to the engine, fuel or venting system, may violate EPA and CARB regulations.**

**Replace all parts including, but not limited to, tires, belts, blades, and fuel system components with original Toro parts.**

The enclosed engine owner's manual is supplied for information regarding the US Environmental Protection Agency (EPA) and the California Emission Control Regulation of emission systems, maintenance, and warranty. Replacements may be ordered through the engine manufacturer.

## ⚠ WARNING

### CALIFORNIA Proposition 65 Warning

**The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.**

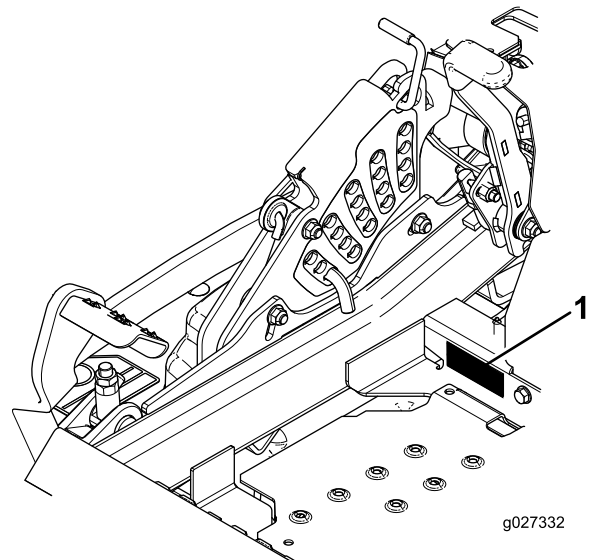
# Introduction

This rotary-blade, riding lawn mower is intended to be used by residential homeowners or professional, hired operators. It is designed primarily for cutting grass on well-maintained lawns on residential or commercial properties. It is not designed for cutting brush or for agricultural uses.

Read this information carefully to learn how to operate and maintain your product properly and to avoid injury and product damage. You are responsible for operating the product properly and safely.

You may contact Toro directly at [www.Toro.com](http://www.Toro.com) for product safety and operation training materials, accessory information, help finding a dealer, or to register your product.

Whenever you need service, genuine Toro parts, or additional information, contact an Authorized Service Dealer or Toro Customer Service and have the model and serial numbers of your product ready. [Figure 1](#) identifies the location of the model and serial numbers on the product. Write the numbers in the space provided.



**Figure 1**

1. Model and serial number location

Model No. \_\_\_\_\_

Serial No. \_\_\_\_\_

This manual identifies potential hazards and has safety messages identified by the safety-alert symbol ([Figure 2](#)), which signals a hazard that may cause serious injury or death if you do not follow the recommended precautions.



Figure 2

1. Safety-alert symbol

This manual uses 2 words to highlight information. **Important** calls attention to special mechanical information and **Note** emphasizes general information worthy of special attention.

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# Safety

**Improperly using or maintaining the machine can result in injury.** To reduce the potential for injury, comply with these safety instructions, and pay attention to the safety-alert symbol, which means **Caution**, **Warning**, or **Danger**—personal safety instruction. **Failure to comply with the instructions may result in personal injury or death.**

**Important:** This machine was manufactured according to the appropriate regulatory standards in effect at the time of manufacture. Modifying this machine in any way may cause it to be out of compliance with those standards and with the instructions in this *Operator's Manual*. Modifications to this machine should only be made by either the manufacturer or an Authorized Toro Dealer.

This product is capable of amputating hands and feet. Follow all safety instructions to avoid serious injury or death.

The owner/user can prevent and is responsible for accidents or injuries occurring to people, or damage to property.

**Important:** The addition of attachments made by other manufacturers that do not meet American National Standards Institute certification will cause noncompliance of this machine.

## Safe Operating Practices

The following instructions are adapted from ANSI standard B71.4-2012.

## Training

- Read the *Operator's Manual* and other training material.

**Note:** If the operator(s) or mechanic(s) cannot read the manual language, it is the owner's responsibility to explain this material to them.

- Become familiar with the safe operation of the equipment, operator controls, and safety signs.
- All operators and mechanics should be trained. The owner is responsible for training the users.
- Never let children or untrained people operate or service the equipment. Local regulations may restrict the age of the operator.
- The owner/user can prevent and is responsible for accidents or injuries occurring to people, or damage to property.

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## Preparation

- Evaluate the terrain to determine what accessories and attachments are needed to properly and safely perform the job.

**Note:** Use only accessories and attachments approved by the manufacturer.

- Wear appropriate clothing, including eye protection, substantial, slip-resistant shoes, and hearing protection. Tie back long hair and do not wear jewelry.
- Inspect the area where the equipment is used, and remove all objects that can be thrown by the machine.
- Check that operator-presence controls, safety switches and shields are attached and functioning properly. Do not operate unless they are functioning properly.

## Operation

- Lightning can cause severe injury or death. If lightning is seen or thunder is heard in the area, do not operate the machine; seek shelter.
- Do not run an engine in an enclosed area.
- Only operate in well-lit areas, keeping away from holes and hidden hazards.
- Ensure that all drives are in neutral and that the parking brake is engaged before starting engine. Start the engine from the operating position only.
- Slow down and use extra care on hillsides. Be sure to travel side to side on hillsides. Turf conditions can affect the stability of the machine. Use caution while operating near drop-offs.
- Slow down and use caution when making turns and when changing directions on slopes.
- Do not raise the mower deck with the blades running.
- Do not operate the machine without the PTO shield or other guards securely in place. Be sure all interlocks are attached, adjusted properly, and functioning properly.
- Do not operate with the discharge deflector raised, removed or altered, unless using a grass catcher.
- Do not change the engine governor setting or overspeed the engine.
- Stop on level ground, disengage drives, engage the parking brake (if provided), shut off the engine before leaving the operator's position for any reason, including emptying the catchers or unclogging the chute.
- Stop the equipment and inspect the blades after striking objects or if an abnormal vibration occurs. Make the necessary repairs before resuming operation.

- Keep your hands and feet away from the cutting unit.
- Look behind and down before backing up to ensure a clear path.
- Keep pets and bystanders away from an operating machine.
- Slow down and use caution when making turns and crossing roads and sidewalks. Stop the blades if you are not mowing.
- Be aware of the mower-discharge direction and do not point it at anyone.
- Do not operate the mower under the influence of alcohol or drugs.
- Use care when loading or unloading the machine into or from a trailer or truck.
- Use care when approaching blind corners, shrubs, trees, or other objects that may obscure vision.

## Safe Handling of Fuels

- To avoid personal injury or property damage, use extreme care in handling gasoline. Gasoline is extremely flammable and the vapors are explosive.
- Extinguish all cigarettes, cigars, pipes, and other sources of ignition.
- Use only an approved fuel container.
- Do not remove the fuel cap or add fuel with the engine running.
- Allow the engine to cool before fueling.
- Do not refuel the machine indoors.
- Do not store the machine or fuel container where there is an open flame, spark, or pilot light, such as on a water heater or on other appliances.
- Do not fill containers inside a vehicle, on a truck, or on a trailer bed with a plastic liner. Always place containers on the ground away from your vehicle before filling.
- Remove equipment from the truck or trailer and fuel it on the ground. If this is not possible, then add fuel with such equipment as a portable container rather than from a fuel-dispenser nozzle.
- Keep the nozzle in contact with the rim of the fuel tank or container opening at all times until fueling is complete.
- Do not use a nozzle lock-open device.
- If you spill fuel on your clothing, change your clothing immediately.
- Do not overfill the fuel tank. Replace the fuel cap and tighten it securely.

## Maintenance and Storage

- Disengage drives, set the parking brake, shut off the engine, and remove the key or disconnect spark-plug wire. Wait for all movement to stop before adjusting, cleaning, or repairing.
- Park the machine on a level surface.
- Clean grass and debris from the cutting unit, drives, mufflers, and engine to help prevent fires.
- Clean up oil or fuel spillage.
- Let the engine cool before storing.
- Do not store fuel near flames or drain indoors.
- Do not allow untrained personnel to service machine.
- Use jack stands to support components when required.
- Carefully release pressure from components with stored energy.
- Disconnect the battery or remove the spark-plug wire before making any repairs. Disconnect the negative terminal first and the positive terminal last. Reconnect the positive first and negative last.
- Use care when checking the blades. Wrap the blade(s) or wear thickly-padded gloves, and use caution when servicing them. Only replace blades; do not straighten or weld them.
- Keep hands and feet away from moving parts. If possible, do not make adjustments with the engine running.
- Keep all parts in good working condition and all hardware tightened. Replace all worn or damaged decals.

This product is designed for cutting and recycling grass, or, when equipped with a grass bagger, for catching cut grass. Any use for purposes other than these could prove dangerous to the user and bystanders.

## Hauling

- Use care when loading or unloading the machine into a trailer or a truck.
- Use full-width ramps for loading machine into a trailer or a truck.
- Tie the machine down securely using straps, chains, cable, or ropes. Both front and rear straps should be directed down and outward from the machine.

## Toro Mower Safety

The following list contains safety information specific to Toro products and other safety information you must know.

This product is capable of amputating hands and feet, and of throwing objects. Always follow all safety instructions to avoid serious injury or death.

## General Operation

- Be sure that the area is clear of bystanders before mowing. Stop the machine if anyone enters the area.
- Do not touch equipment or attachment parts which may be hot from operation. Allow all of the parts to cool before attempting to maintain, adjust, or service the machine.
- Use only Toro-approved attachments. Warranty may be voided if used with any unapproved attachments.
- Check carefully for overhead clearances (i.e., branches, doorways, electrical wires, etc.) before operating under any objects, and do not contact them.
- Slow down before making turns and use extra caution.
- Use caution when riding the platform over curbs, rocks, roots, or other obstructions.
- Look behind and down before backing up to ensure a clear path. Use extra care when operating in reverse.
- Do not jerk the controls; use a steady motion.
- When loading or unloading the machine, use one full-width ramp that is wide enough to extend beyond the width of the machine.
- Do not carry passengers.
- Do not carry equipment on the machine.

## Slope Operation

All slopes and ramps require extra caution. If you feel uneasy on a slope, do not mow it.

- Remove obstacles such as rocks, tree limbs, etc. from the mowing area.
- Watch for holes, ruts or bumps.

**Note:** Tall grass can hide obstacles.

- Use caution near drop-offs, ditches, or embankments.

**Note:** The machine could suddenly turn over if a wheel goes over the edge of a cliff or ditch, or if an edge caves in.

- Use extra care with grass catchers or other attachments.

**Note:** These can change the stability of the machine.

- Keep all movement on slopes slow and gradual.
- Do not make sudden changes in speed or direction.
- Mow slopes side to side.
- Do not mow slopes greater than 15 degrees.

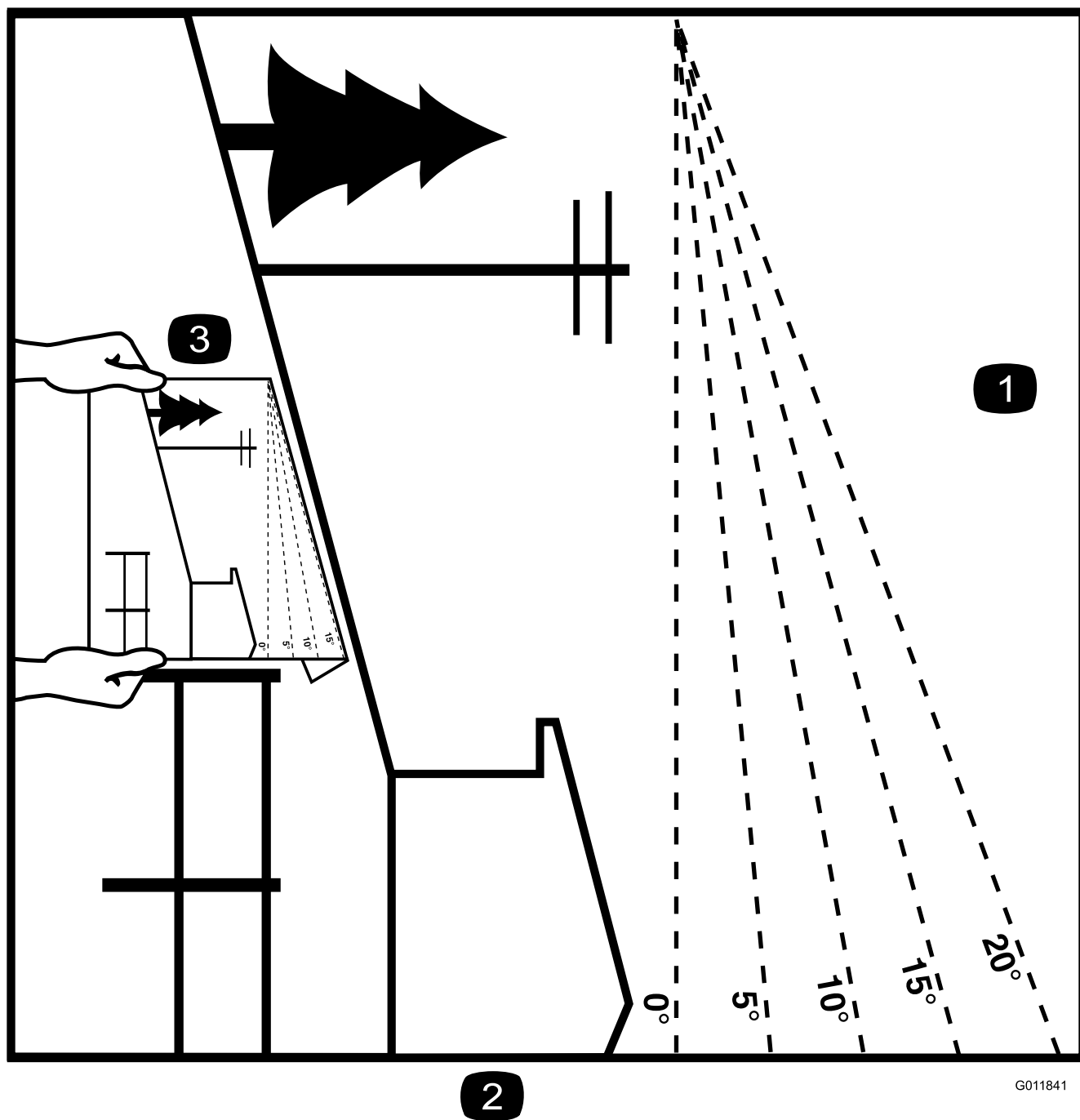
## Using the Rollover-Protection System (ROPS)

- The ROPS is an integral and effective safety device. Keep the ROPS in the raised and locked position and use the seat belt when operating the machine.
- Lower the ROPS temporarily only when absolutely necessary. Do not wear the seat belt when the ROPS is folded down.
- Be aware there is no rollover protection when the ROPS is in the down position.
- Be certain that the seat belt can be released quickly in the event of an emergency.
- Check the area to be mowed and never fold down the ROPS in areas where there are slopes, drop offs or water.
- Check carefully for overhead clearances (i.e. branches, doorways, electrical wires) before driving under any objects and do not contact them.
- Keep the ROPS in safe operating condition by periodically thoroughly inspecting for damage and keeping all mounting fasteners tight.
- Replace a damaged ROPS. Do not repair or revise.
- **Do not** remove the ROPS.
- Any alterations to a ROPS must be approved by the manufacturer.

## Service

- Do not store the machine or a fuel container inside where there is an open flame, such as near a water heater or furnace.
- Keep the nuts and bolts tight, especially the blade-attachment bolts.
- Never interfere with the intended function of a safety device or reduce the protection provided by a safety device. Check their proper operation regularly.
- To ensure optimum performance and continued safety certification of the machine, use only genuine Toro replacement parts and accessories. Replacement parts and accessories made by other manufacturers could be dangerous, and such use could void the product warranty.
- Check brake operation frequently. Adjust and service as required.

# Slope Indicator



G011841

g011841

**Figure 3**

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1. The maximum slope you can safely operate the machine on is **15 degrees**. Use the slope chart to determine the degree of slope of hills before operating. **Do not operate this machine on a slope greater than 15 degrees.** Fold along the appropriate line to match the recommended slope.
2. Align this edge with a vertical surface, a tree, building, fence pole, etc.
3. Example of how to compare slope with folded edge



# Safety and Instructional Decals



Safety decals and instructions are easily visible to the operator and are located near any area of potential danger. Replace any decal that is damaged or lost.



1

58-6520

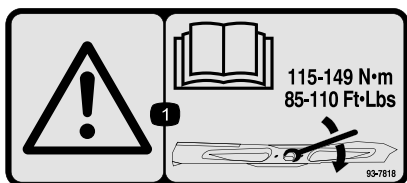
decal58-6520



106-2655

decal106-2655

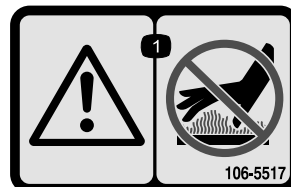
1. Grease



93-7818

decal93-7818

1. Warning—read the *Operator's Manual* for instructions on torquing the blade bolt/nut to 115 to 149 N-m (85 to 110 ft-lb).

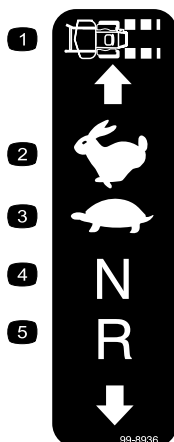


106-5517

decal106-5517

1. Warning—do not touch or approach moving belts; remove the ignition key and read the instructions before servicing or performing maintenance.

1. Warning—do not touch the hot surface.



99-8936

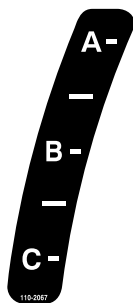
decal99-8936

- |                  |            |
|------------------|------------|
| 1. Machine speed | 4. Neutral |
| 2. Fast          | 5. Reverse |
| 3. Slow          |            |



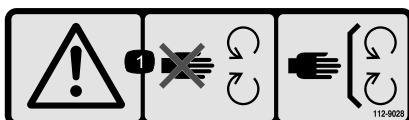
107-3069

1. Warning—there is no rollover protection when the roll bar is down.
2. To avoid injury or death from a rollover accident, keep the roll bar in the raised and locked position and wear the seat belt. Lower the roll bar only when absolutely necessary; do not wear the seat belt when the roll bar is down.
3. Read the *Operator's Manual*; drive slowly and carefully.



110-2067

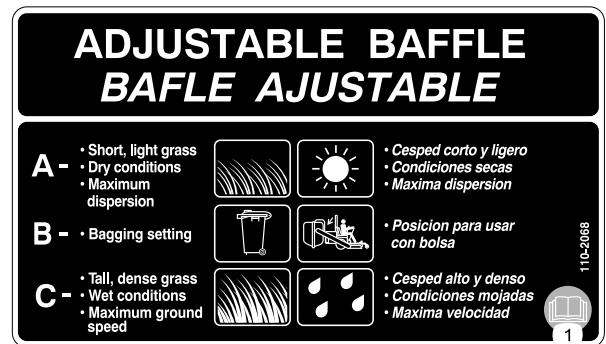
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112-9028

decal112-9028

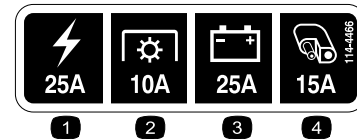
1. Warning—stay away from moving parts; keep all guards in place.



110-2068

decal110-2068

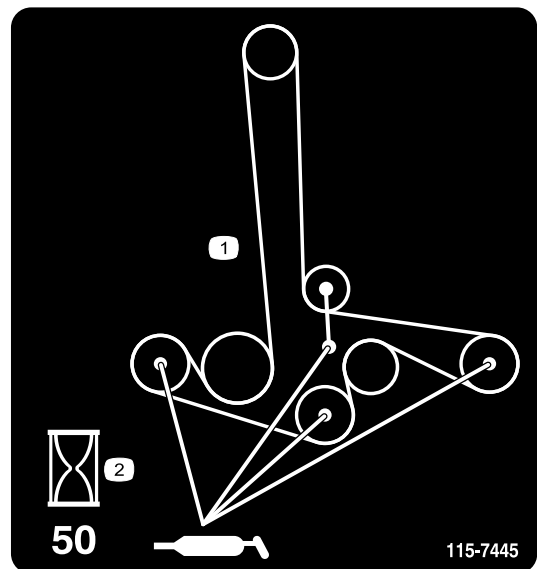
1. Read the *Operator's Manual*.



114-4466

decal114-4466

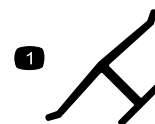
1. Main, 25 A
2. PTO, 10 A
3. Charge, 25 A
4. Auxiliary, 15 A



115-7445

decal115-7445

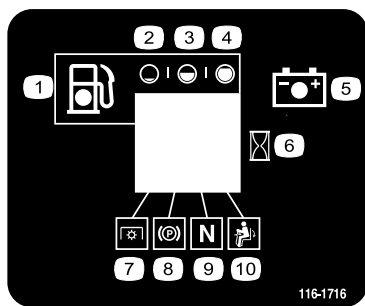
1. Grease pulleys and spindles
2. Maintenance interval—50 hours



Manufacturer's Mark

decal115-7445

1. Indicates the blade is identified as a part from the original machine manufacturer



116-1716

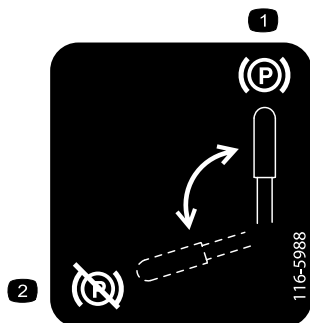
decal116-1716

- |            |                              |
|------------|------------------------------|
| 1. Fuel    | 6. Hour meter                |
| 2. Empty   | 7. PTO                       |
| 3. Half    | 8. Parking brake             |
| 4. Full    | 9. Neutral                   |
| 5. Battery | 10. Operator-presence switch |



116-4858

decal116-4858



116-5988

decal116-5988

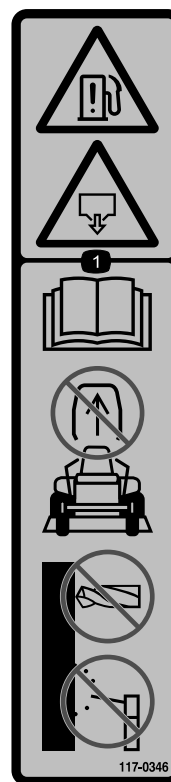
- |                          |                             |
|--------------------------|-----------------------------|
| 1. Parking brake—engaged | 2. Parking brake—disengaged |
|--------------------------|-----------------------------|



116-8726

decal116-8726

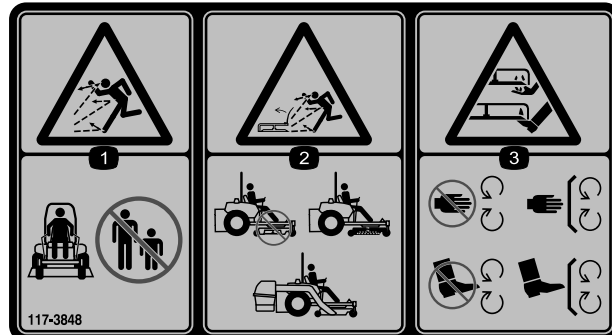
1. Read the *Operator's Manual* for the recommended hydraulic fluid.



117-0346

decal117-0346

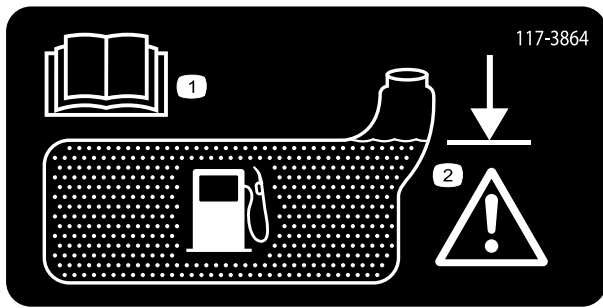
1. Fuel leak hazard—read the *Operator's Manual*; do not attempt to remove the roll bar; do not weld, drill or modify the roll bar in any way.



117-3848

decal117-3848

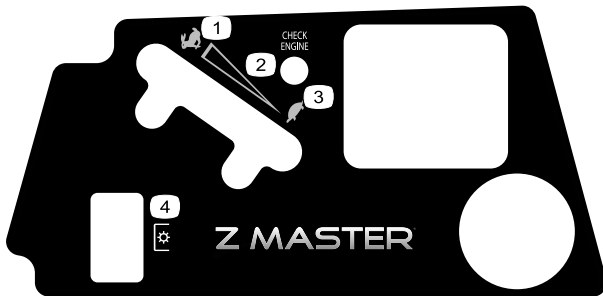
1. Thrown object hazard—keep bystanders a safe distance from the machine
2. Thrown object hazard, mower—do not operate without the deflector, discharge cover or grass collection system in place.
3. Cutting/dismemberment of hand or foot—stay away from moving parts; keep all guards and shields in place.



decal117-3864

### 117-3864

1. Read the *Operator's Manual*.
2. Fill to bottom of filler neck; warning—do not overfill the tank.



decal121-7586

### 121-7586

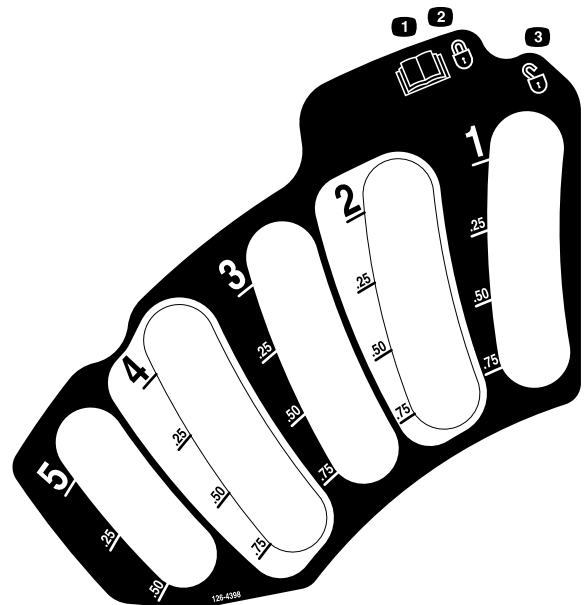
1. Fast
2. Variable-speed control
3. Slow
4. Power takeoff (PTO)



decal126-2055

### 126-2055

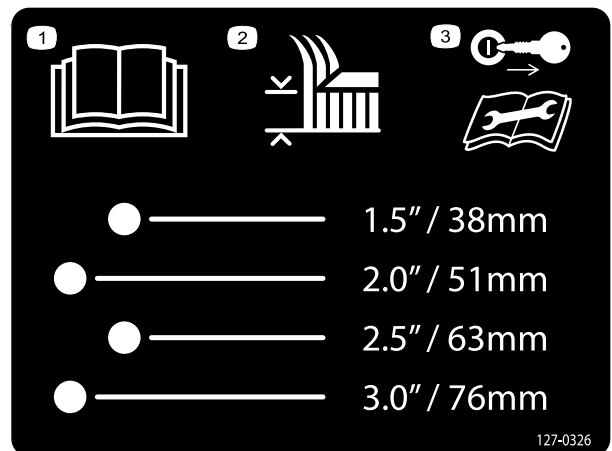
1. Wheel lug nut torque 95 ft-lb (129 N-m) (4x)
2. Wheel hub nut torque 235 ft-lb (319 N-m)
3. Read and understand the Operator's manual before performing any maintenance, check torque after first 100 hours then every 500 hours thereafter.



decal126-4398

### 126-4398

1. Read the *Operator's manual*.
2. Lock
3. Unlock



127-0326

### 127-0326

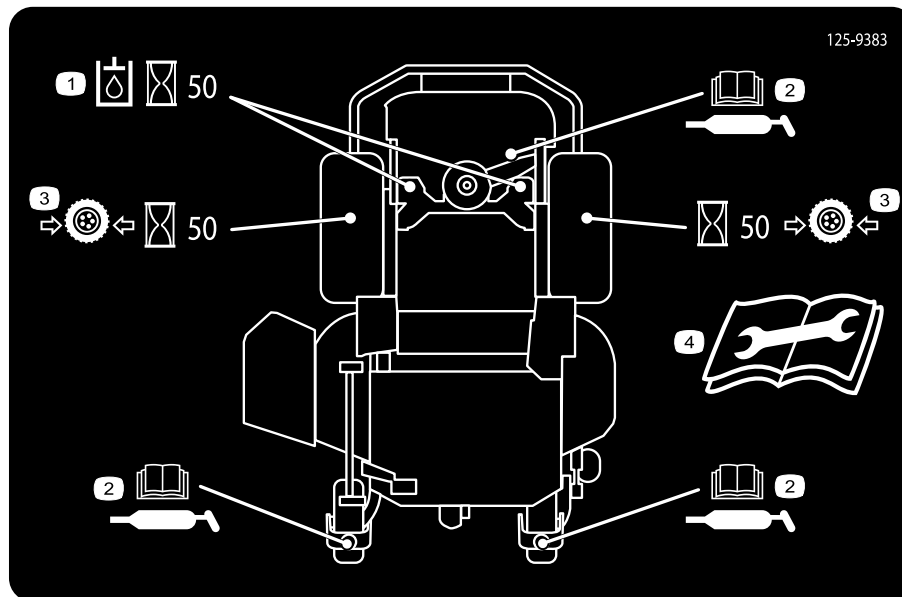
1. Read the *Operator's Manual*.
2. Height-of-cut
3. Remove the key from the ignition and read the *Operator's Manual* before performing maintenance or servicing the machine.



### Battery Symbols

Some or all of these symbols are on your battery

- |  |  |
|--|--|
| 1. Explosion hazard                    | 6. Keep bystanders a safe distance from the battery.                           |
| 2. No fire, open flame, or smoking.    | 7. Wear eye protection; explosive gases can cause blindness and other injuries |
| 3. Caustic liquid/chemical burn hazard | 8. Battery acid can cause blindness or severe burns.                           |
| 4. Wear eye protection                 | 9. Flush eyes immediately with water and get medical help fast.                |
| 5. Read the <i>Operator's Manual</i> . | 10. Contains lead; do not discard.   |



### 125-9383

decal125-9383

- |  |  |
|--|--|
| 1. Check hydraulic oil every 50 operating hours.                                 | 3. Check the tire pressure every 50 operating hours.                             |
| 2. Read the <i>Operator's Manual</i> for information on lubricating the machine. | 4. Read the <i>Operator's Manual</i> before servicing or performing maintenance. |



132-0871

decal132-0871

**Note:** This machine complies with the industry standard stability test in the static lateral and longitudinal tests with the maximum recommended slope indicated on the decal. Review the instructions for operating the machine on slopes in the *Operator's Manual* as well as the conditions in which you would operate the machine to determine whether you can operate the machine in those conditions on that day and at that site. Changes in the terrain can result in a change in slope operation for the machine. If possible, keep the cutting units lowered to the ground while operating the machine on slopes. Raising the cutting units while operating on slopes can cause the machine to become unstable.

1. Warning—read the *Operator's Manual*; do not operate this machine unless you are trained; wear hearing protection.
2. Cutting, dismembering, and entanglement hazard—keep hands away from moving parts; keep all guards and shields in place.
3. Thrown object hazard—keep bystanders away.
4. Ramp hazard—when loading onto a trailer, do not use dual ramps; only use a singular ramp wide enough for the machine and that has an incline less than 15°; back up the ramp (in reverse) and drive forward off the ramp.
5. Bodily harm hazard—do not carry passengers; look behind you when mowing in reverse.
6. Tipping hazard on slopes—do not use on slopes near open water; do not use on slopes greater than 15°.

# Product Overview

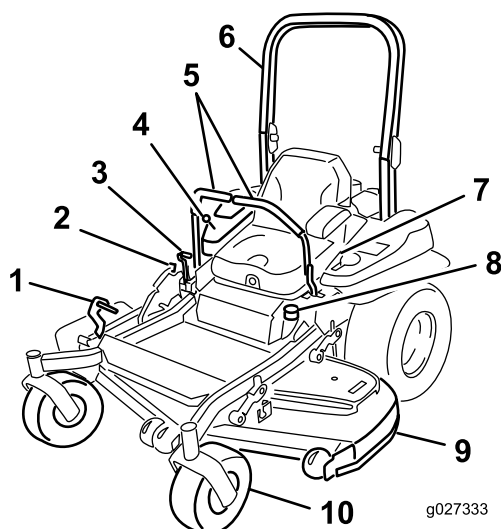


Figure 4

- |                                  |                  |
|----------------------------------|------------------|
| 1. Height-of-cut deck-lift pedal | 6. Roll bar      |
| 2. Transport lock                | 7. Seat belt     |
| 3. Parking-brake lever           | 8. Fuel cap      |
| 4. Controls                      | 9. Mower deck    |
| 5. Motion-control levers         | 10. Caster wheel |

## Controls

Become familiar with all the controls before you start the engine and operate the machine (Figure 4 and Figure 5).

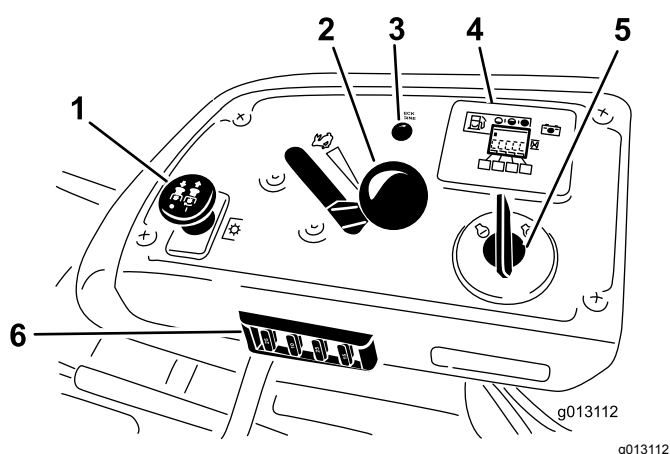


Figure 5

- |                                      |   |
|--------------------------------------|---|
| 1. PTO switch                        | 4. Hour meter/Safety-interlock display/Fuel gauge |
| 2. Throttle control                  | 5. Ignition switch                                |
| 3. Malfunction-indicator light (MIL) | 6. Fuses  |

## Hour Meter

The hour meter records the number of hours the engine has operated. It operates when the engine is running. Use these times for scheduling regular maintenance (Figure 6).

## Fuel Gauge

The fuel gauge is located with the hour meter, and the bars light up when the ignition switch is in the On position (Figure 6).

The indicator light appears when the fuel level is low (approximately one gallon remaining in the fuel tank).

## Safety-Interlock Indicators

There are symbols on the hour meter, and the indicate with a black triangle that the interlock component is in the correct position (Figure 6).

## Battery-Indicator Light

If the ignition key is turned to the **On** position for a few seconds, the battery voltage will be displayed in the area where the hours are normally displayed.

The battery light turns on when the ignition is turned on and when the charge is below the correct operating level (Figure 6).

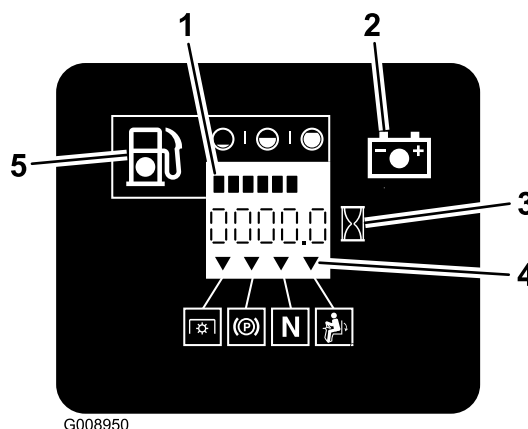


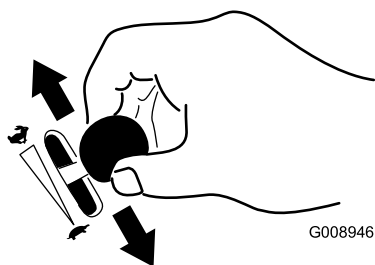
Figure 6

- |                      |                             |
|----------------------|-----------------------------|
| 1. Fuel gauge (bars) | 4. Safety-interlock symbols |
| 2. Battery light     | 5. Low fuel-indicator light |
| 3. Hour meter        |                             |

## Throttle Control

You can move the throttle control between the FAST and SLOW positions (Figure 7).

Always use the FAST position when turning on the mower deck with the blade-control switch (PTO).



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g008946

Figure 7

**Note:** When the engine starts, release the key.

**Important:** Do not engage starter for more than 5 seconds at a time. If the engine fails to start allow a 15-second cool-down period between attempts. Failure to follow these instructions can burn out the starter motor.

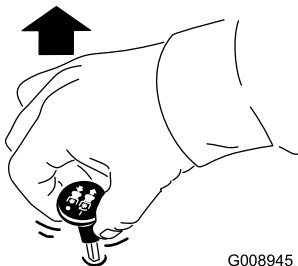
**Note:** You may need multiple attempts to start the engine the first time after adding fuel to an empty fuel system.

## Blade-Control Switch (PTO)

The blade-control switch (PTO) is used to engage the electric clutch and drive the mower blades. Pull the switch up to engage the blades and release. To disengage the blades, push the blade-control switch (PTO) down or move a motion-control lever into the NEUTRAL-LOCK position.

### Engaging the Blade-Control Switch (PTO)

**Note:** Engaging the blade-control switch (PTO) with the throttle position at half or less will cause excessive wear to the drive belts.

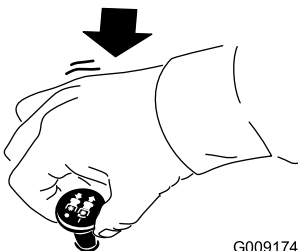


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g008945

Figure 8

### Disengaging the Blade-Control Switch (PTO)



G009174

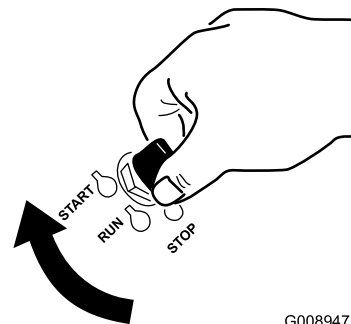
g009174

Figure 9

## Ignition Switch

This switch is used to start the mower engine and has 3 positions: START, RUN, and STOP.

1. Turn the ignition key to the START position (Figure 10).



G008947

g008947

Figure 10

2. Turn the ignition key to stop to shut off the engine.

## Motion-Control Levers

The motion-control levers are used to drive the machine forward, reverse, and turn either direction.

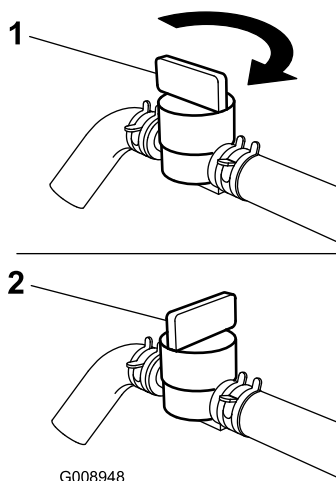
## Fuel-Shutoff Valve

The fuel-shutoff valve is located under the seat. Move the seat forward to access it.

Close the fuel-shutoff valve for transporting, maintaining, or storing the machine.

Ensure that the fuel-shutoff valve is open when starting the engine.





**Figure 11**

1. On position

2. Off position

## Electronic Control Unit Malfunction-Indicator Light

The electronic control unit (ECU) continuously monitors the operation of the EFI system.

If the system detects a problem or fault, the malfunction-indicator light (MIL) illuminates.

The MIL is the red light located in the right console panel.

If the MIL illuminates, perform the initial troubleshooting checks; refer to the MIL section in [Troubleshooting \(page 69\)](#).

If these checks do not correct the problem, further diagnosis and servicing by an Authorized Service Dealer is necessary.

## Attachments/Accessories

A selection of Toro approved attachments and accessories is available for use with the machine to enhance and expand its capabilities. Contact your Authorized Service Dealer or Distributor or go to [www.Toro.com](http://www.Toro.com) for a list of all approved attachments and accessories.

## Specifications

**Note:** Specifications and design are subject to change without notice.

### Width

	48-inch Deck
Without Deck	116.1 cm (45.7 inches)
Deflector Up	137.2 cm (54 inches)
Deflector Down	161.4 cm (63.6 inches)

### Length

	48-inch Deck
Roll Bar—Up	201.2 cm (79.2 inches)
Roll Bar—Down	205.5 cm (80.9 inches)

### Height

Roll Bar—Up	Roll Bar—Down
179.1 cm (70.5 inches)	118.9 cm (46.8 inches)

### Weight

Model	Weight
74904	508 kg (1,120 lb)

# Operation

**Note:** Determine the left and right sides of the machine from the normal operating position.

## Adding Fuel

- For best results, use only clean, fresh (less than 30 days old), unleaded gasoline with an octane rating of 87 or higher ((R+M)/2 rating method).
- **Ethanol:** Gasoline with up to 10% ethanol (gasohol) or 15% MTBE (methyl tertiary butyl ether) by volume is acceptable. Ethanol and MTBE are not the same. Gasoline with 15% ethanol (E15) by volume is not approved for use. **Never use gasoline that contains more than 10% ethanol by volume**, such as E15 (contains 15% ethanol), E20 (contains 20% ethanol), or E85 (contains up to 85% ethanol). Using unapproved gasoline may cause performance problems and/or engine damage which may not be covered under warranty.
- **Do not** use gasoline containing methanol.
- **Do not** store fuel either in the fuel tank or fuel containers over the winter unless a fuel stabilizer is used.
- **Do not** add oil to gasoline.

### ⚠ DANGER

In certain conditions, gasoline is extremely flammable and highly explosive. A fire or explosion from gasoline can burn you and others and can damage property.

- Fill the fuel tank outdoors, in an open area, when the engine is cold. Wipe up any gasoline that spills.
- Never fill the fuel tank inside an enclosed trailer.
- Do not fill the fuel tank completely full. Add gasoline to the fuel tank until the level is 6 to 13 mm (1/4 to 1/2 inch) below the bottom of the filler neck. This empty space in the tank allows gasoline to expand.
- Never smoke when handling gasoline, and stay away from an open flame or where gasoline fumes may be ignited by a spark.
- Store gasoline in an approved container and keep it out of the reach of children. **Never buy more than a 30-day supply of gasoline.**
- Do not operate without entire exhaust system in place and in proper working condition.

### ⚠ DANGER

In certain conditions during fueling, static electricity can be released causing a spark which can ignite the gasoline vapors. A fire or explosion from gasoline can burn you and others and can damage property.

- Always place gasoline containers on the ground away from your vehicle before filling.
- Do not fill gasoline containers inside a vehicle or on a truck or trailer bed because interior carpets or plastic truck bed liners may insulate the container and slow the loss of any static charge.
- When practical, remove gas-powered equipment from the truck or trailer and refuel the equipment with its wheels on the ground.
- If this is not possible, then refuel such equipment on a truck or trailer from a portable container, rather than from a gasoline dispenser nozzle.
- If a gasoline dispenser nozzle must be used, keep the nozzle in contact with the rim of the fuel tank or container opening at all times until fueling is complete.

### ⚠ WARNING

Gasoline is harmful or fatal if swallowed. Long-term exposure to vapors can cause serious injury and illness.

- Avoid prolonged breathing of vapors.
- Keep face away from nozzle and gas tank or conditioner bottle opening.
- Avoid contact with skin; wash off spillage with soap and water.

## Using Stabilizer/Conditioner

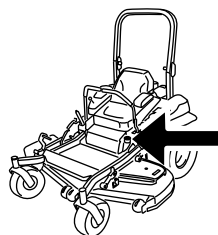
Use a fuel stabilizer/conditioner in the machine to provide the following benefits:

- Keeps gasoline fresh during storage of 90 days or less. For longer storage it is recommended that the fuel tank be drained.
- Cleans the engine while it runs
- Eliminates gum-like varnish buildup in the fuel system, which causes hard starting

**Important:** Do not use fuel additives containing methanol or ethanol.

Add the correct amount of gas stabilizer/conditioner to the gas.

**Note:** A fuel stabilizer/conditioner is most effective when mixed with fresh gasoline. To minimize the chance of varnish deposits in the fuel system, use fuel stabilizer at all times.

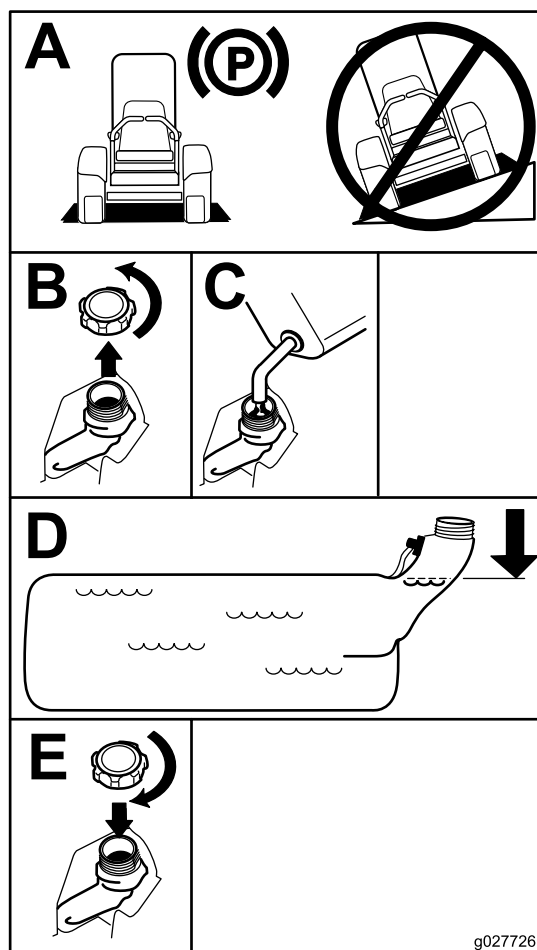


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g009189

## Filling the Fuel Tank

1. Park the machine on level ground.
2. Shut the engine off and set the parking brake.
3. Clean around the fuel-tank cap and remove it. Add regular unleaded gasoline to the fuel tank until the level is 6 to 13 mm (1/4 to 1/2 inch) below the bottom of the filler neck (Figure 12).

**Note:** This space in the tank allows the gasoline to expand. Do not fill the fuel tank completely full



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Figure 12

## Checking the Engine-Oil Level

Before you start the engine and use the machine, check the oil level in the engine crankcase; refer to [Checking the Engine-Oil Level \(page 40\)](#).

## Breaking in a New Machine

New engines take time to develop full power. Mower decks and drive systems have higher friction when new, placing additional load on the engine. Allow 40 to 50 hours of break-in time for new machines to develop full power and best performance.

# Using the Rollover-Protection System (ROPS)

## ⚠ WARNING

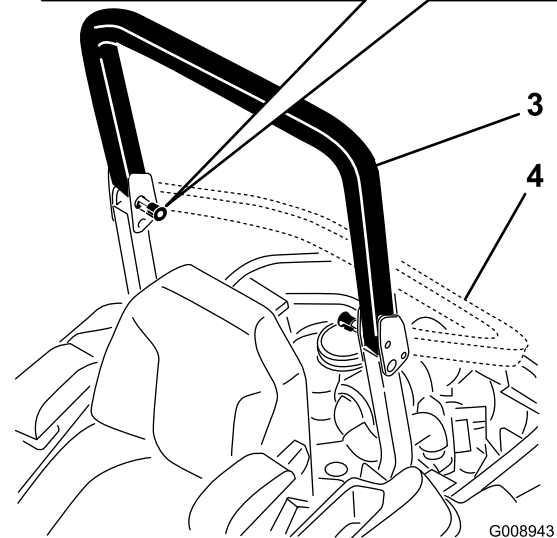
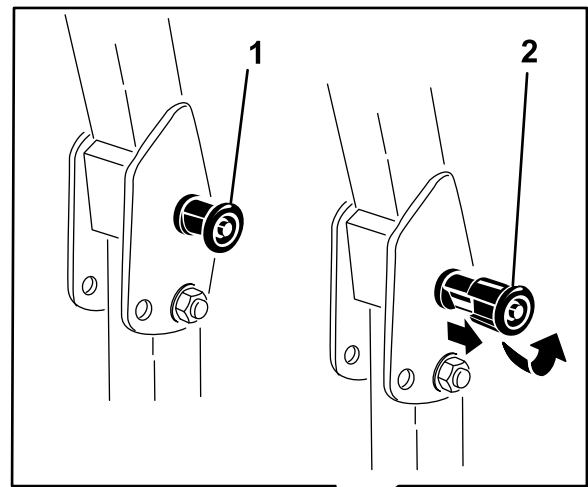
To avoid injury or death from rollover, keep the roll bar in the fully raised locked position and use the seat belt.

Ensure the seat is secured to the machine.

## ⚠ WARNING

There is no rollover protection when the roll bar is in the down position.

- Lower the roll bar only when absolutely necessary.
- Do not wear the seat belt when the roll bar is in the down position.
- Drive slowly and carefully.
- Raise the roll bar as soon as clearance permits.
- Check carefully for overhead clearances (i.e. branches, doorways, electrical wires) before driving under any objects and do not contact them.



g008943

Figure 13

1. To lower the roll bar, apply forward pressure to the upper part of the roll bar.
  2. Pull both knobs out and rotate them 90° so they are not engaged (Figure 13).
  3. Lower the roll bar to the down position (Figure 13).
  3. Roll bar in the upright position
  4. Roll bar in the folded position
  4. To raise the roll bar, raise the roll bar to the operate position, rotate the knobs so that they move partially into the grooves (Figure 13).
  5. Raise the roll bar to the full upright position while pushing on the upper roll bar and the pins will snap into position when the holes align with the pins (Figure 13).
- Important:** Always use the seat belt with the roll bar in the raised position.
6. Push on the roll bar and ensure that both pins are engaged.

# Think Safety First

Please read all safety instructions and symbols in the safety section. Knowing this information could help you or bystanders avoid injury.

## ⚠ DANGER

Operating the machine on wet grass or steep slopes can cause sliding and loss of control.

- Do not operate on slopes greater than 15 degrees.
- Reduce speed and use extreme caution on slopes.
- Do not operate the machine near water.

## ⚠ DANGER

Wheels dropping over edges can cause rollovers, which may result in serious injury, death, or drowning.

Do not operate the machine near drop-offs.

## ⚠ DANGER

Operating the machine while the roll bar is down may lead to serious injury or death in the event of a rollover.

Always keep the roll bar in the fully raised and locked position and use the seat belt.

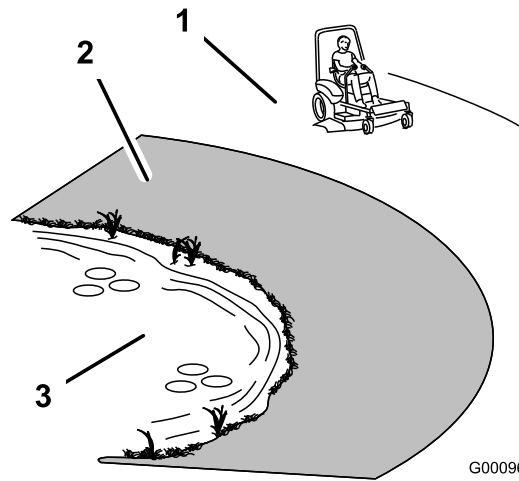


Figure 14

1. Safe Zone—use the Z Master here on slopes less than 15 degrees or flat areas.
2. Danger Zone—use a walk-behind mower and/or a hand trimmer on slopes greater than 15 degrees, near drop-offs and water.
3. Water

## ⚠ CAUTION

This machine produces sound levels in excess of 85 dBA at the operators ear and can cause hearing loss through extended periods of exposure.

Wear hearing protection when operating this machine.

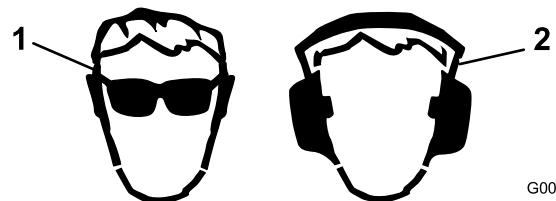


Figure 15

1. Wear eye protection.
2. Wear hearing protection.

## Operating the Parking Brake

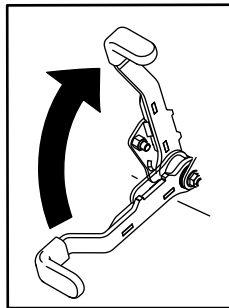
Always set the parking brake when you stop the machine or leave it unattended.

## Setting the Parking Brake

### ⚠ WARNING

Parking brake may not hold machine parked on a slope and could cause personal injury or property damage.

Do not park on slopes unless the wheels are chocked or blocked.

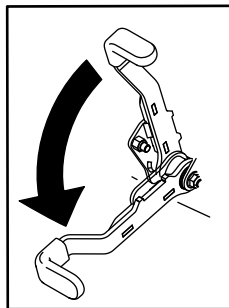


g027334

Figure 16

g027334

## Releasing the Parking Brake



g027335

Figure 17

g027335

## Starting and Stopping the Engine

### Starting the Engine

1. Raise the ROPS up and lock into place, sit on the seat, and fasten the seat belt.
2. Move the motion controls to NEUTRAL-LOCK position.
3. Set the parking brake; refer to [Setting the Parking Brake \(page 22\)](#).
4. Move the blade-control switch (PTO) to the OFF position ([Figure 18](#)).
5. Move the throttle lever midway between the SLOW and FAST positions.

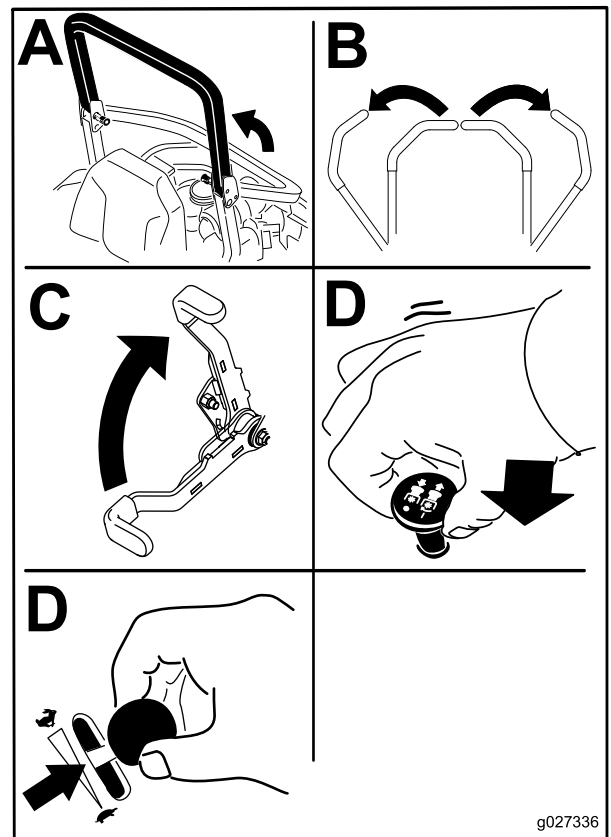


Figure 18

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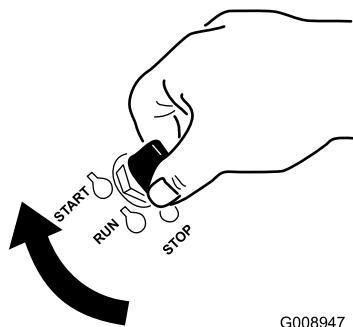
6. Turn the ignition key to the Start position ([Figure 19](#)).

**Note:** When the engine starts, release the key.

**Important:** Do not engage starter for more than 5 seconds at a time. If the engine fails to start allow a 15-second cool-down period between attempts. Failure to follow these instructions can burn out the starter motor.

**Note:** Additional starting cycles may be required when starting the engine for the first

time after the fuel system has been without fuel completely.



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Figure 19

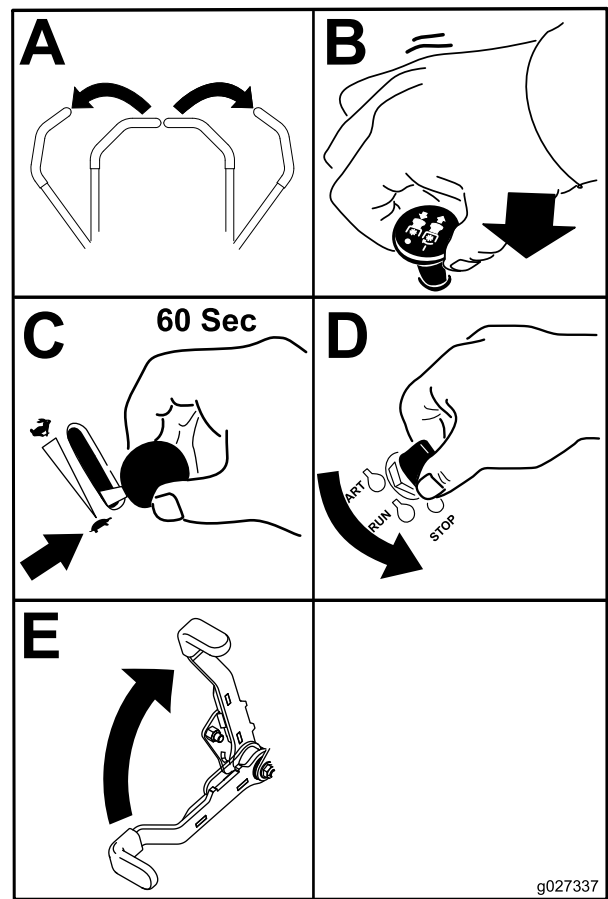
## Stopping the Engine

### ⚠ CAUTION

Children or bystanders may be injured if they move or attempt to operate the machine while it is unattended.

**Always remove the ignition key and set the parking brake when leaving the machine unattended, even if just for a few minutes.**

Let the engine idle at slow throttle (turtle) for 60 seconds before turning the ignition switch off.



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g027337

Figure 20

**Important:** Ensure that the fuel-shutoff valve is closed before transporting or storing the machine, as fuel leakage may occur. Set the parking brake before transporting. Make sure to remove the key as the fuel pump may run and cause the battery to lose charge.

## Using the Safety-Interlock System

### ⚠ CAUTION

If safety-interlock switches are disconnected or damaged the machine could operate unexpectedly, causing personal injury.

- Do not tamper with the interlock switches.
- Check the operation of the interlock switches daily and replace any damaged switches before operating the machine.

# Understanding the Safety-Interlock System

The safety-interlock system is designed to prevent the engine from starting unless the following occurs:

- The parking brake is engaged.
- The blade-control switch (PTO) is disengaged.
- The motion-control levers are in the NEUTRAL-LOCK position.

The safety-interlock system also is designed to shut off the engine when you move the traction controls from the LOCKED position with the parking brake engaged or if you rise from the seat when the PTO is engaged.

The hour meter has symbols to notify the user when the interlock component is in the correct position. When the component is in the correct position, a triangle lights up in the corresponding square.

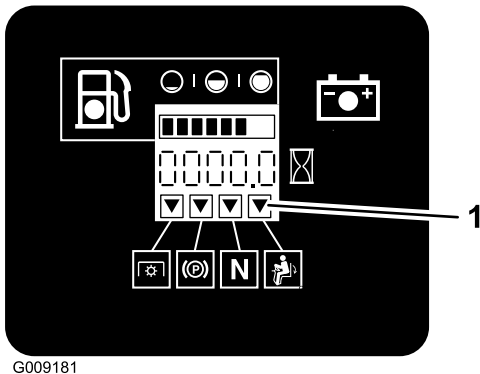


Figure 21

1. Triangles light up when the interlock components are in the correct position

## Testing the Safety-Interlock System

**Service Interval:** Before each use or daily

Test the safety-interlock system before you use the machine each time. If the safety system does not operate as described below, have an Authorized Service Dealer repair the safety system immediately.

1. Sitting on the seat, engage the parking brake and move the blade-control switch (PTO) to the ON position. Try starting the engine; the engine should not start.
2. Sitting on the seat, engage the parking brake and move the blade-control switch (PTO) to the OFF position. Move either motion-control lever (out of the NEUTRAL-LOCK position). Try starting the engine; the engine should not start. Repeat for other control lever.

3. Sitting on the seat, engage the parking brake, move the blade-control switch (PTO) to the OFF position, and move the motion-control levers to NEUTRAL-LOCK position. Now start the engine. While the engine is running, release the parking brake, engage the blade-control switch (PTO) and rise slightly from the seat; the engine should shut off.
4. Sitting on the seat, engage the parking brake, move the blade-control switch (PTO) to the OFF position, and move the motion-control levers to NEUTRAL-LOCK position. Now start the engine. While the engine is running, center either motion control and move (forward or reverse); the engine should stop. Repeat for other motion control.
5. Sitting on the seat, disengage the parking brake, move the blade-control switch (PTO) to the OFF position, and move the motion-control levers to NEUTRAL-LOCK position. Try starting the engine; the engine should not start.

## Driving Forward or Backward

The throttle control regulates the engine speed as measured in rpm (revolutions per minute). Place the throttle control in the FAST position for best performance. Always operate at full throttle when mowing.

### ⚠ CAUTION

**The machine can spin very rapidly, causing you to lose control of the machine, resulting in personal injury and/or damage to machine.**

- Use caution when making turns.
- Slow the machine down before making sharp turns.



## Using the Motion-Control Levers

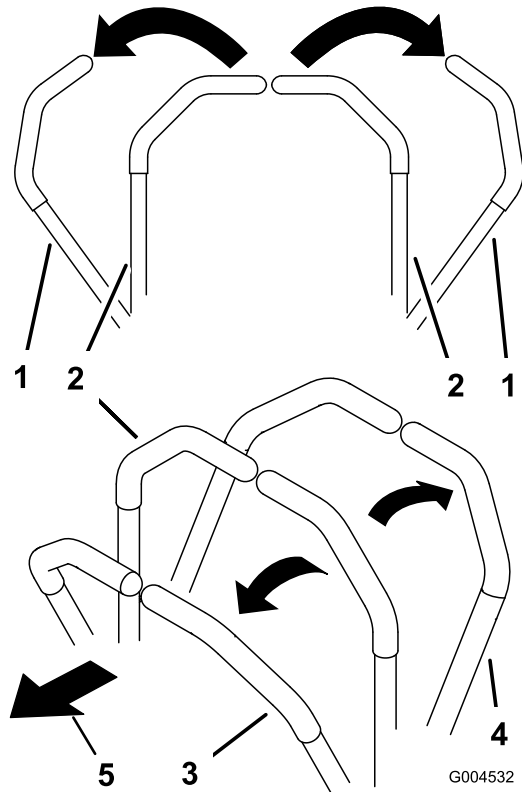


Figure 22

1. Motion-control lever (NEUTRAL-LOCK position)
2. Center, unlocked position
3. Forward
4. Backward
5. Front of machine

## Driving Forward

**Note:** The engine will shut off if you move the traction-control levers with the parking brake engaged.

To stop the machine, pull the motion-control levers to the NEUTRAL position.

1. Release the parking brake; refer to [Releasing the Parking Brake \(page 22\)](#).
2. Move the levers to the center, unlocked position.
3. To go forward, slowly push the motion-control levers forward ([Figure 23](#)).

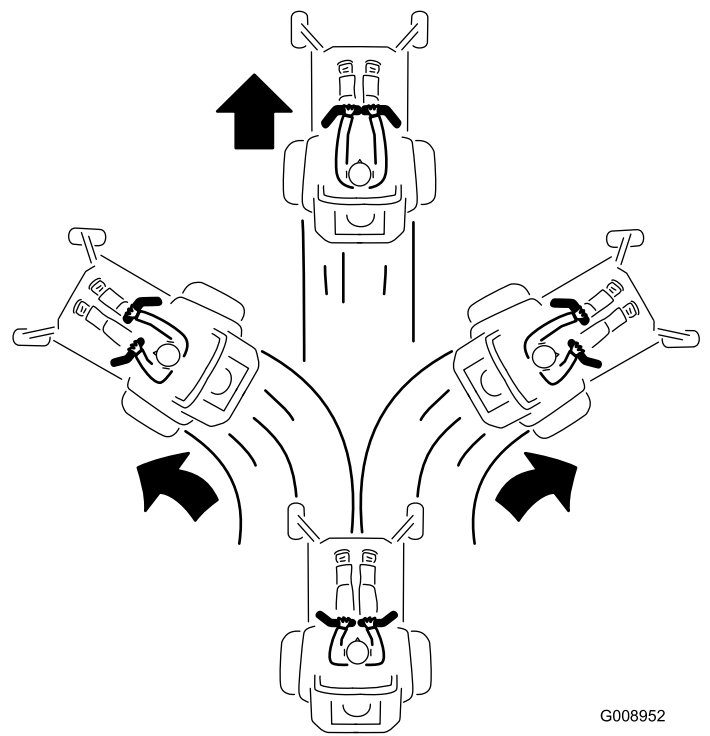


Figure 23

## Driving Backward

1. Move the levers to the center, unlocked position.
2. To go backward, slowly pull the motion-control levers rearward ([Figure 24](#)).

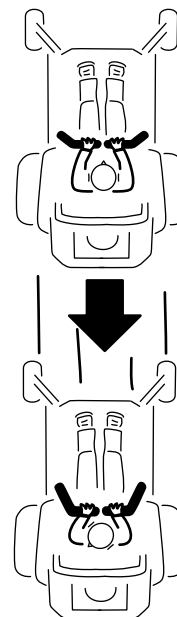


Figure 24

# Stopping the Machine

To stop the machine, move the traction-control levers to neutral, and then move them to the LOCKED position, disengage the power takeoff (blade-control switch (PTO)), and turn the ignition key to the OFF position.

Set the parking brake when you leave the machine; refer to [Setting the Parking Brake \(page 22\)](#). Remember to remove the key from the ignition switch.

## **⚠ CAUTION**

**Children or bystanders may be injured if they move or attempt to operate the machine while it is unattended.**

**Always remove the ignition key and set the parking brake when leaving the machine unattended, even if just for a few minutes.**

# Adjusting the Height-of-Cut

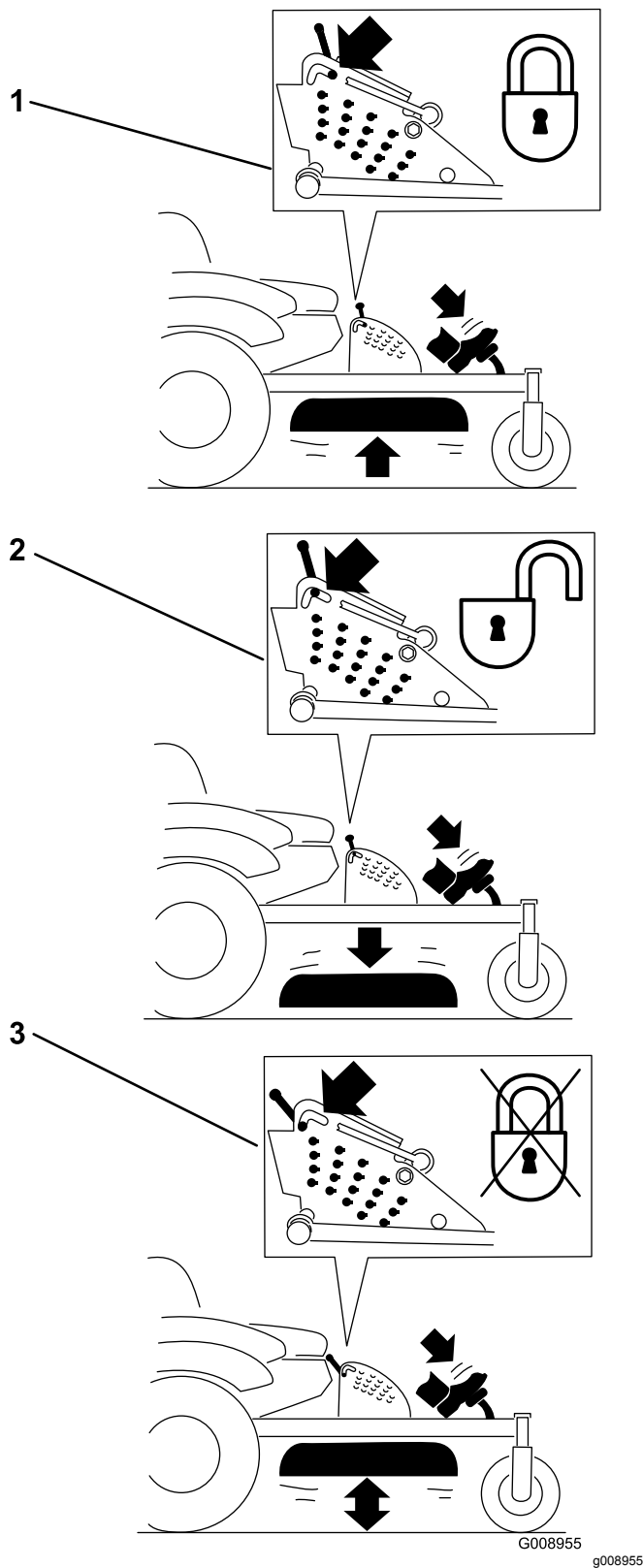
## Using the Transport Lock

The transport lock has 2 positions, which are used with the deck-lift pedal. There is a LOCK position and an UNLOCK position for the transport position. Use the transport lock with the deck-lift pedal ([Figure 25](#)).

## Adjusting the Height-of-Cut Pin

The height-of-cut is adjusted from 25 to 140 mm (1 to 5-1/2 inches) in 6 mm (1/4 inch) increments by relocating the clevis pin into different hole locations.

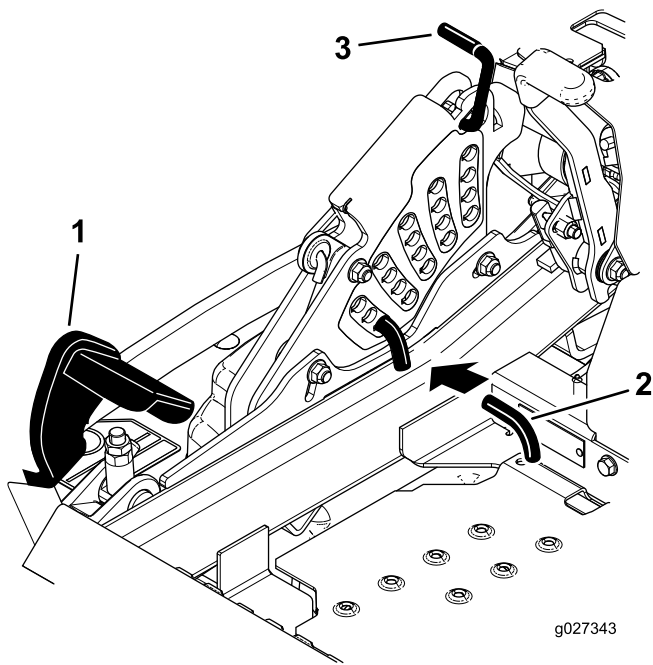
1. Move the transport lock to the LOCK position.
2. Push on the deck-lift pedal with your foot, and raise the mower deck to the transport position (also the 140 mm (5-1/2 inches) cutting height position) as shown in [Figure 26](#).
3. To adjust, rotate the pin 90 degrees and remove the pin from the height-of-cut bracket ([Figure 26](#)).
4. Select a hole in the height-of-cut bracket corresponding to the height-of-cut desired, and insert the pin ([Figure 26](#)).
5. Push on the deck lift, pull back on the transport lock, and slowly lower the mower deck.



**Figure 25**

Transport-Lock Positions

1. Transport lock
2. Lock position—release the lock from the locked position
3. UNLOCK position—does not lock the mower deck into transport position



**Figure 26**

1. Deck-lift pedal
2. Cut-of-height pin
3. Transport lock

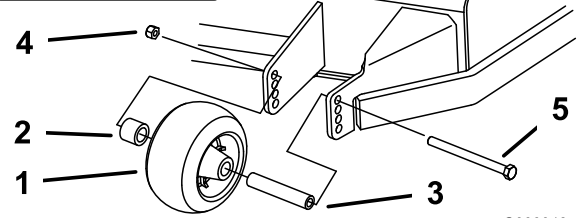
## Adjusting the Anti-Scalp Rollers

Whenever you change the height of cut, adjust the height of the anti-scalp rollers.

1. Disengage the blade-control switch (PTO), move the motion-control levers to the NEUTRAL-LOCK position, and set the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Adjust the anti-scalp rollers as shown in [Figure 27](#), [Figure 28](#), and [Figure 29](#).

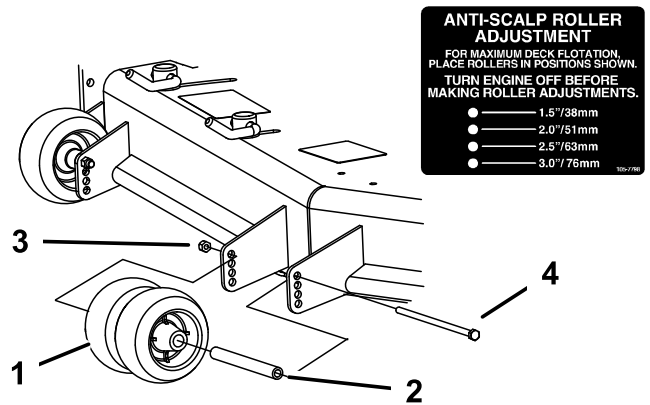
**ANTI-SCALP ROLLER ADJUSTMENT**  
FOR MAXIMUM DECK FLOTATION, PLACE ROLLERS IN POSITIONS SHOWN.  
TURN ENGINE OFF BEFORE MAKING ROLLER ADJUSTMENTS.

- 1.5"/38mm
- 2.0"/51mm
- 2.5"/63mm
- 3.0"/76mm



**Figure 27**

1. Anti-scalp roller
2. Spacer
3. Bushing
4. Flange nut
5. Bolt

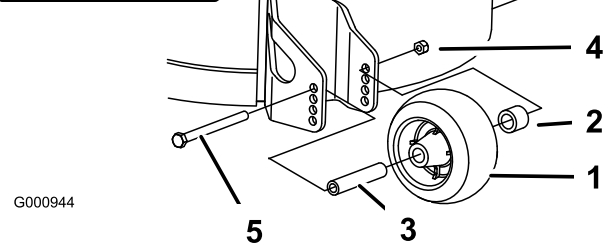


**Figure 28**

1. Anti-scalp roller
2. Bushing
3. Flange nut
4. Bolt

**ANTI-SCALP ROLLER ADJUSTMENT**  
FOR MAXIMUM DECK FLOTATION, PLACE ROLLERS IN POSITIONS SHOWN.  
TURN ENGINE OFF BEFORE MAKING ROLLER ADJUSTMENTS.

- 1.5"/38mm
- 2.0"/51mm
- 2.5"/63mm
- 3.0"/76mm



**Figure 29**

1. Anti-scalp roller
2. Spacer
3. Bushing
4. Flange nut
5. Bolt

# Adjusting the Flow-Baffle-Cam Locks

This procedure is applicable only to machines with the flow-baffle locks. Certain models have nuts and bolts in place of the flow-baffle locks and you can adjust them the same.

You can adjust the mower-discharge flow for different types of mowing conditions. Position the cam locks and baffle to give the best quality of cut.

1. Disengage the blade-control switch (PTO), move the motion-control levers to the NEUTRAL-LOCK position, and set the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. To adjust the cam locks, swing the lever up to loosen the cam lock (Figure 30).
4. Adjust the baffle and cam locks in the slots to the desired discharge flow.
5. Swing the lever back over to tighten the baffle and cam locks (Figure 30).
6. If the cam locks do not lock the baffle into place or it is too tight, loosen the lever and then rotate the cam lock.

**Note:** Adjust the cam lock until you obtain the desired locking pressure.

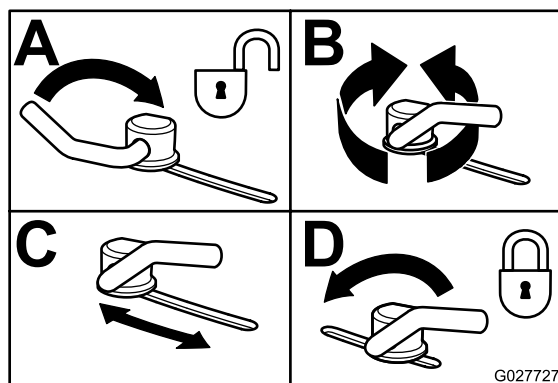


Figure 30

## Positioning the Flow Baffle

The following figures are only recommendations for use. Adjustments vary by grass type, moisture content, and the height of the grass.

**Note:** If the engine power draws down and the mower ground speed is the same, open up the baffle.

## Position A

This is the full rear position. The suggested use for this position is as follows:

- Short, light grass mowing conditions
- Dry conditions
- Smaller grass clippings
- Propels grass clippings farther away from the mower

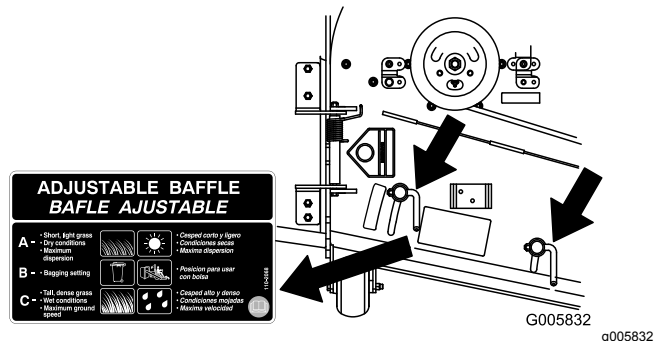


Figure 31

## Position B

Use this position when bagging. Always align it with the blower opening.

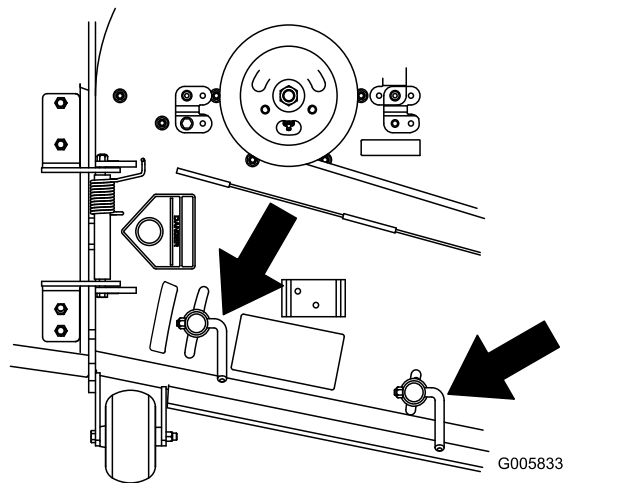


Figure 32

## Position C

This is the full-open position. Use this position is as follows:

- Tall, dense grass mowing conditions
- Wet conditions
- Lowers the engine-power consumption
- Allows increased ground speed in heavy conditions
- This position is similar to the benefits of the Toro SFS mower

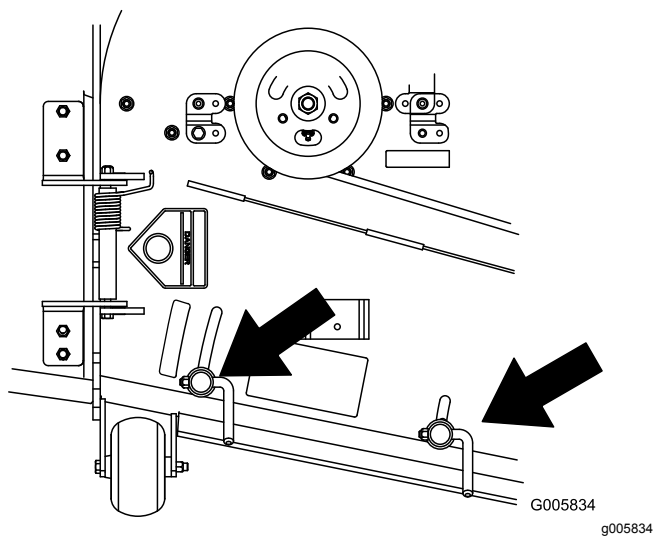


Figure 33

## Positioning the Seat

The seat moves forward and backward. Position the seat where you have the best control of the machine and are most comfortable.

To adjust, move the lever sideways to unlock the seat (Figure 34).

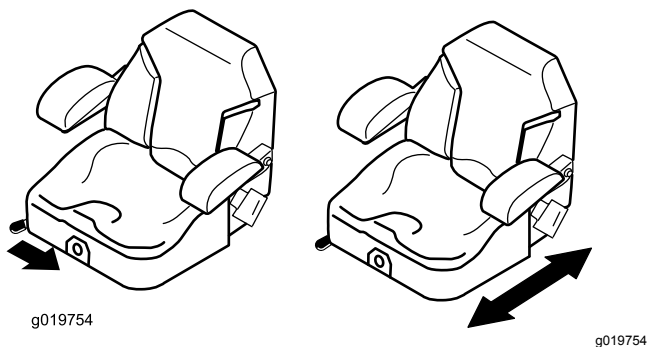


Figure 34

## Unlatching the Seat

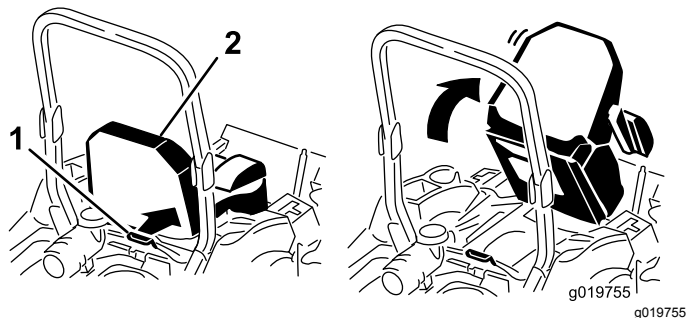


Figure 35

1. Seat latch

2. Seat

## Changing the Seat Suspension

The seat adjusts to provide a smooth and comfortable ride. Position the seat where you are most comfortable.

To adjust the seat, turn the knob in front either direction to provide the best comfort (Figure 36).

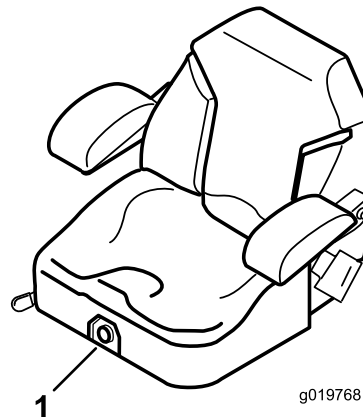


Figure 36

1. Seat-suspension knob

## Using the Drive-Wheel-Release Valves

### ⚠ WARNING

Hands may become entangled in the rotating drive components below the engine deck, which could result in serious injury.

Shut off the engine, remove the key, and allow all moving parts to stop before accessing the drive-wheel-release valves.

### ⚠ WARNING

The engine and hydraulic-drive units can become very hot. Touching a hot engine or hydraulic-drive units can cause severe burns.

Allow the engine and hydraulic-drive units to cool completely before accessing the drive-wheel-release valves.

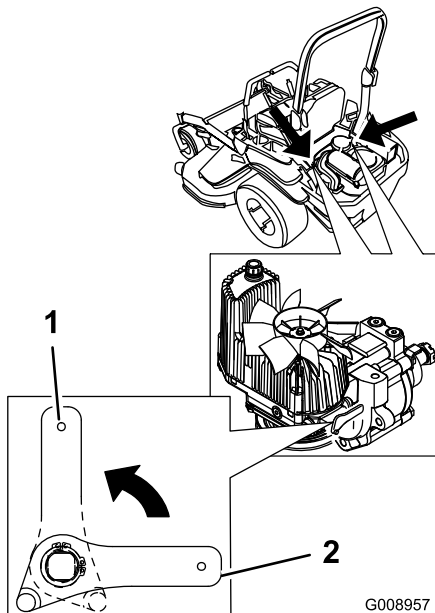
The drive-wheel-release valves are located in the back of each hydraulic-drive unit, under the seat.

**Note:** Ensure that the release valves are in the fully horizontal position when operating the machine or severe damage to the hydraulic system can occur.

1. Disengage the PTO (blade-control switch), turn the ignition key to the OFF position, move the levers to NEUTRAL-LOCK position, apply the parking brake, and remove the key.
2. Rotate the release-valve levers vertically to push the machine (Figure 37).

**Note:** This allows hydraulic fluid to bypass the pump, enabling the wheels to turn.

3. Disengage the parking brake before pushing the machine.



**Figure 37**

1. Vertical to push the machine
2. Horizontal to run the machine

4. Rotate the release-valve levers horizontally to run the machine (Figure 37).

## Using the Side Discharge

The mower has a hinged grass deflector that disperses clippings to the side and down toward the turf.

### **⚠ DANGER**

**Without a grass deflector, discharge cover, or complete grass-catcher assembly mounted in place, you and others are exposed to blade contact and thrown debris. Contact with rotating mower blade(s) and thrown debris will cause injury or death.**

- Never remove the grass deflector from the mower because the grass deflector routes material down toward the turf. If the grass deflector is ever damaged, replace it immediately.
- Never put your hands or feet under the mower.
- Never try to clear the discharge area or mower blades unless you move the power takeoff (blade-control switch (PTO)) to the OFF position, rotate the ignition key to the OFF position, and remove the key.
- Ensure that the grass deflector is in the down position.



# Transporting the Machine

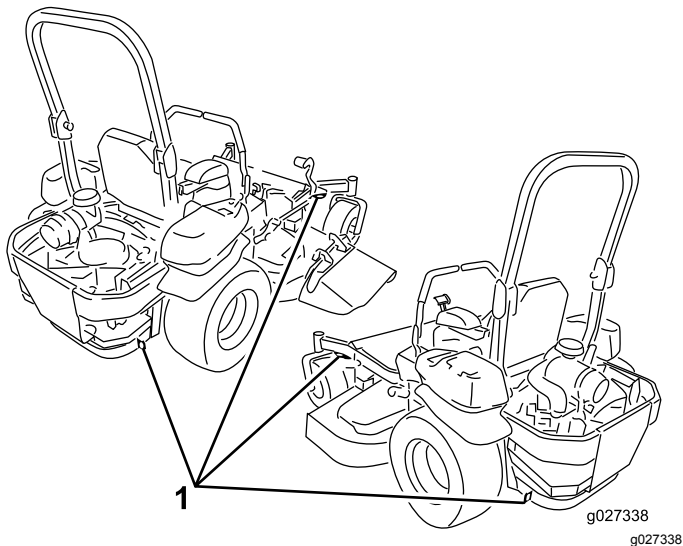
Use a heavy-duty trailer or truck to transport the machine. Ensure that the trailer or truck has all the necessary brakes, lighting, and marking as required by law. Please carefully read all the safety instructions. Knowing this information could help you, your family, pets, or bystanders avoid injury.

## ⚠ WARNING

**Driving on the street or roadway without turn signals, lights, reflective markings, or a slow-moving vehicle emblem is dangerous and can lead to accidents, causing personal injury.**

**Do not drive machine on a public street or roadway.**

1. If using a trailer, connect it to the towing vehicle, and connect the safety chains.
2. If applicable, connect the trailer brakes.
3. Load the machine onto the trailer or truck.
4. Shut off the engine, remove the key, set the brake, and close the fuel valve.
5. Use the metal tie-down loops on the machine to securely fasten the machine to the trailer or truck with straps, chains, cable, or ropes (Figure 38).

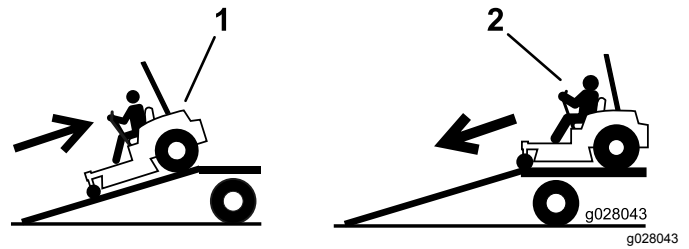


**Figure 38**

1. Traction unit tie-down loops

# Loading the Machine

Use extreme caution when loading or unloading machines onto a trailer or a truck. Use a full-width ramp that is wider than the machine for this procedure. Back up ramps and drive forward down ramps (Figure 39).



**Figure 39**

1. Back the machine up the ramp.
2. Drive the machine forward down the ramp.

**Important: Do not use narrow individual ramps for each side of the machine.**

Ensure that the ramp is long enough so that the angle with the ground does not exceed 15 degrees (Figure 40). On flat ground, this requires a ramp to be at least 4 times as long as the height of the trailer or truck bed to the ground. A steeper angle may cause mower components to get caught as the unit moves from the ramp to the trailer or truck. Steeper angles may also cause the machine to tip or lose control. If loading on or near a slope, position the trailer or truck so that it is on the down side of the slope and the ramp extends up the slope. This will minimize the ramp angle.



## ⚠ WARNING

Loading a machine onto a trailer or truck increases the possibility of tip-over and could cause serious injury or death.

- Use extreme caution when operating a machine on a ramp.
- Ensure that the ROPS is in the up position and use the seat belt when loading or unloading the machine. Ensure that the ROPS will clear the top of an enclosed trailer.
- Use only a full-width ramp; do not use individual ramps for each side of the machine.
- Do not exceed a 15-degree angle between the ramp and the ground or between the ramp and the trailer or truck.
- Ensure the length of ramp is at least four times as long as the height of the trailer or truck bed to the ground. This will ensure that ramp angle does not exceed 15 degrees on flat ground.
- Back up ramps and drive forward down ramps.
- Avoid sudden acceleration or deceleration while driving the machine on a ramp as this could cause a loss of control or a tip-over situation.

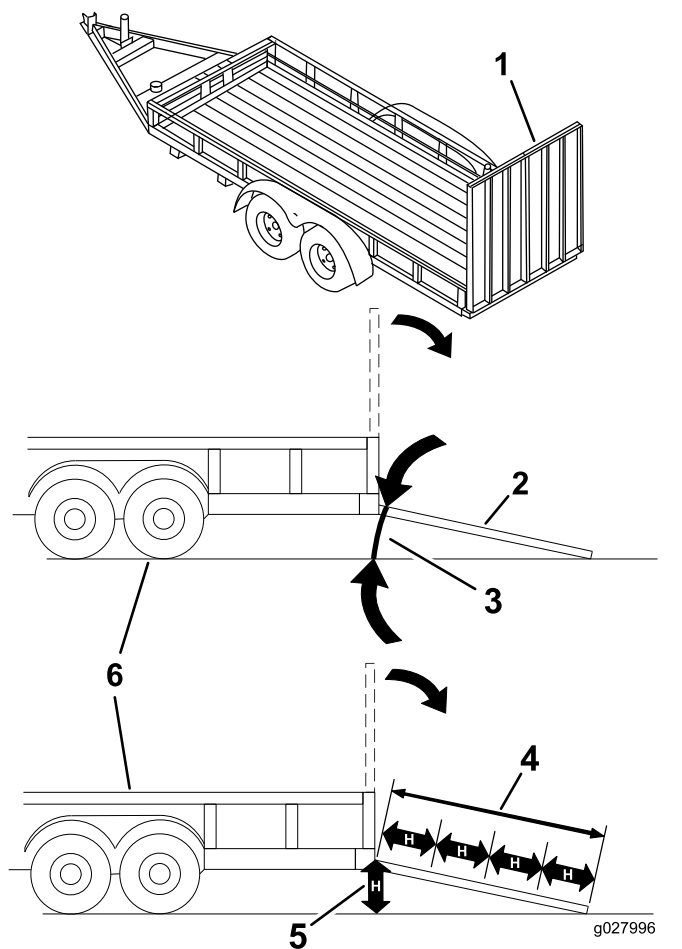


Figure 40

- |   |   |
|---|---|
| 1. Full-width ramp in stowed position               | 4. Ramp is at least 4 times as long as the height of the trailer or truck bed to the ground |
| 2. Side view of full-width ramp in loading position | 5. H= height of the trailer or truck bed to the ground                                      |
| 3. Not greater than 15 degrees                      | 6. Trailer  |

# Operating Tips

## Using the Fast Throttle Setting

For best mowing and maximum air circulation, operate the engine at the FAST throttle position. Air is required to thoroughly cut grass clippings, so do not set the height-of-cut setting so low as to totally surround the mower by uncut grass. Always try to have 1 side of the mower free from uncut grass, which allows air to be drawn into the mower.

## Cutting a Lawn for the First Time

Cut grass slightly longer than normal to ensure that the cutting height of the mower does not scalp any uneven ground. However, the cutting height used in the past is generally the best one to use. When cutting grass longer than 15 cm (6 inches) tall, cut the lawn twice to ensure an acceptable quality of cut.

## Cutting a Third of the Grass Blade

It is best to cut only about 1/3 of the grass blade. Do not cut more than that unless the grass is sparse or it is late fall, when grass grows more slowly.

## Alternating the Mowing Direction

Alternate mowing direction to keep the grass standing straight. This also helps disperse clippings which enhances decomposition and fertilization.

## Mowing at Correct Intervals

Grass grows at different rates at different times. So to maintain the same cutting height, mow more often in early spring. As the grass growth rate slows in midsummer, mow less frequently. If you cannot mow for an extended period, first mow at a high cutting height; then mow again 2 days later at a lower height setting.

## Adjusting the Cutting Speed

To improve cut quality, use a slower ground speed in certain conditions.

## Avoiding Cutting Too Low

If the cutting width of the mower is wider than the mower you previously used, raise the cutting height to ensure that uneven turf is not cut too short.

## Cutting Long Grass

If the grass is ever allowed to grow slightly longer than normal, or if it contains a high degree of moisture, raise the cutting height higher than usual and cut the grass at this setting. Then cut the grass again using the lower, normal setting.

## Stopping the Machine

If you stop the forward motion of the machine while mowing, a clump of grass clippings may drop onto your lawn. To avoid this, move onto a previously cut area with the blades engaged.

## Keeping the Underside of the Mower Clean

Clean clippings and dirt from the underside of the mower after each use. If grass and dirt build up inside the mower, cutting quality will eventually become unsatisfactory.

## Maintaining the Blade

Maintain a sharp blade throughout the cutting season, because a sharp blade cuts cleanly without tearing or shredding the grass blades. Tearing and shredding turns grass brown at the edges, which slows growth and increases the chance of disease. Check the cutter blades daily for sharpness, and for any wear or damage. File down any nicks and sharpen the blades as necessary. If a blade is damaged or worn, replace it immediately with a genuine Toro replacement blade.

# Maintenance

## Recommended Maintenance Schedule(s)

Maintenance Service Interval	Maintenance Procedure
After the first 8 hours	<ul style="list-style-type: none"> <li>• Change the engine oil.</li> </ul>
After the first 100 hours	<ul style="list-style-type: none"> <li>• Check the torque on the wheel-lug-nuts.</li> <li>• Check the wheel hub slotted-nut torque.</li> <li>• Check the parking brake adjustment.</li> </ul>
After the first 250 hours	<ul style="list-style-type: none"> <li>• Change the hydraulic filters and hydraulic fluid when using any type of fluid.</li> </ul>
Before each use or daily	<ul style="list-style-type: none"> <li>• Check the safety system.</li> <li>• Check the engine-oil level.</li> <li>• Check the seat belt.</li> <li>• Check the knobs on the rollover-protection system (ROPS).</li> <li>• Clean the engine screen and the oil cooler.</li> <li>• Check and clean the hydraulic-unit shrouds.</li> <li>• Inspect the blades.</li> <li>• Clean the mower deck.</li> </ul>
Every 50 hours	<ul style="list-style-type: none"> <li>• Grease the mower-deck spindles and the idler arm.</li> <li>• Check the spark arrester (if equipped).</li> <li>• Check the tire pressure.</li> <li>• Inspect the belts for cracks and wear.</li> <li>• Check the hydraulic fluid level.</li> </ul>
Every 100 hours	<ul style="list-style-type: none"> <li>• Lubricate the mower-deck-lift pivots.</li> <li>• Change the engine oil (more often in dirty or dusty conditions).</li> <li>• Check and clean engine-cooling fins and shrouds.</li> </ul>
Every 150 hours	<ul style="list-style-type: none"> <li>• Inspect the primary filter and air-inlet screen.</li> </ul>
Every 200 hours	<ul style="list-style-type: none"> <li>• Change the engine-oil filter.</li> <li>• Replace the fuel filter (more often in dirty or dusty conditions).</li> </ul>
Every 250 hours	<ul style="list-style-type: none"> <li>• Change the hydraulic filters and hydraulic fluid when using Mobil® 1 fluid (more often in dirty or dusty conditions).</li> </ul>
Every 300 hours	<ul style="list-style-type: none"> <li>• Replace the primary air filter (more often in dusty or sandy conditions).</li> <li>• Check the inner air filter.</li> </ul>
Every 500 hours	<ul style="list-style-type: none"> <li>• Check and gap the spark plug.</li> <li>• Check the torque on the wheel-lug-nuts.</li> <li>• Check the wheel hub slotted-nut torque.</li> <li>• Adjust the caster-pivot bearing.</li> <li>• Check the parking brake adjustment.</li> <li>• Change the hydraulic filters and hydraulic fluid when using Toro® HYPR-OIL™ 500 hydraulic fluid (more often in dirty or dusty conditions).</li> </ul>
Every 600 hours	<ul style="list-style-type: none"> <li>• Replace the inner air filter.</li> </ul>
Monthly	<ul style="list-style-type: none"> <li>• Check the battery.</li> </ul>
Yearly	<ul style="list-style-type: none"> <li>• Grease the pump-belt-idler arm.</li> <li>• Grease the front caster pivots (more often in dirty or dusty conditions).</li> <li>• Repack the front caster-wheel bearings (more often in dirty or dusty conditions).</li> <li>• Lubricate the caster-wheel hubs.</li> </ul>
Yearly or before storage	<ul style="list-style-type: none"> <li>• Paint chipped surfaces.</li> <li>• Check all maintenance procedures listed above before storage.</li> </ul>

**Important:** Refer to your engine operator's manual for additional maintenance procedures.

## ⚠ CAUTION

If you leave the key in the ignition switch, someone could accidentally start the engine and seriously injure you or other bystanders.

Remove the key from the ignition before you do any maintenance.

## Lubrication

### Greasing and Lubrication

Grease more frequently when operating conditions are extremely dusty or sandy.

**Grease Type:** No. 2 lithium or molybdenum grease

1. Disengage the blade-control switch (PTO), move the motion-control levers to the NEUTRAL-LOCK position, and set the parking brake.

2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.

3. Clean the grease fittings with a rag.

**Note:** Make sure to scrape any paint off the front of the fitting(s).

4. Connect a grease gun to the fitting.
5. Pump grease into the fittings until grease begins to ooze out of the bearings.
6. Wipe up any excess grease.

### Adding Light Oil or Spray Lubrication

**Service Interval:** Every 100 hours

Lubricate the deck-lift pivots.

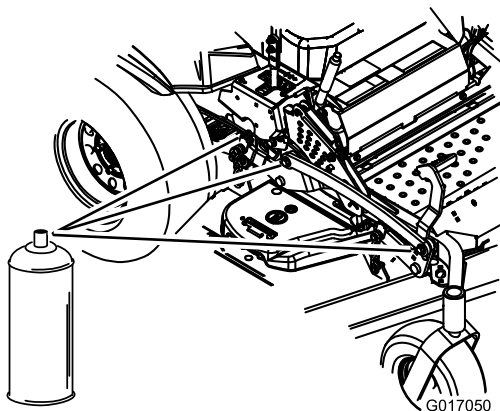


Figure 41

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### Greasing the Mower

**Service Interval:** Every 50 hours—Grease the mower-deck spindles and the idler arm.

Yearly—Grease the pump-belt-idler arm.

Yearly—Grease the front caster pivots (more often in dirty or dusty conditions).

Yearly—Repack the front caster-wheel bearings (more often in dirty or dusty conditions).

**Important:** Ensure that the cutting-unit spindles are full of grease weekly.

1. Disengage the blade-control switch (PTO), move the motion-control levers to the NEUTRAL-LOCK position, and set the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Grease the mower deck idler-pulley pivot until grease comes out the bottom (Figure 42).
4. Grease the 3 spindle bearings until grease comes out (Figure 42).

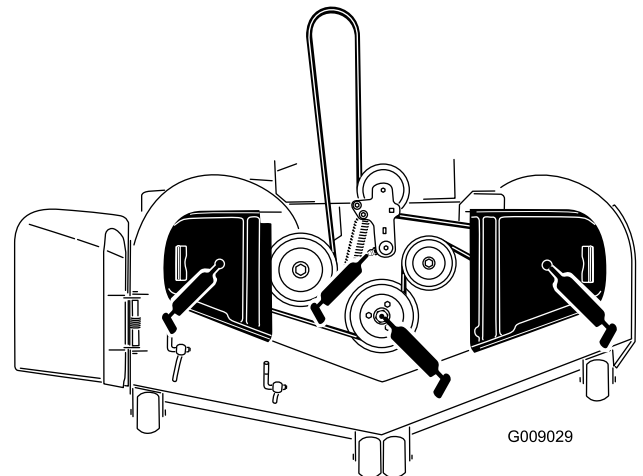


Figure 42

g009029

5. Grease the drive-belt-idler arm (Figure 43).

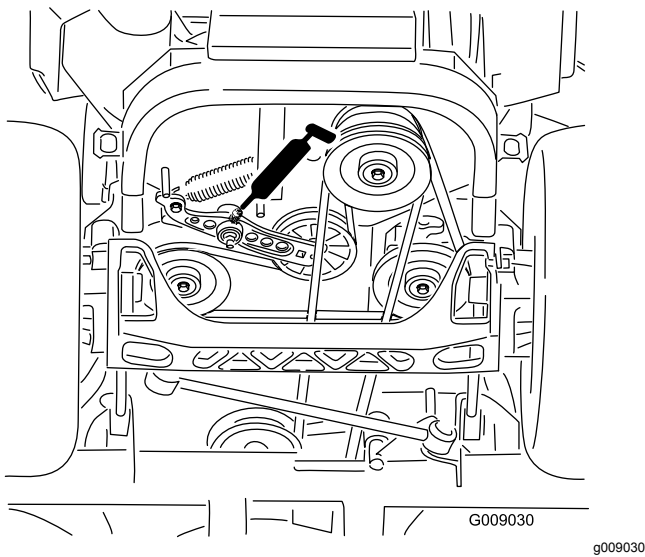


Figure 43

6. Remove the dust cap and adjust the caster pivots.

**Note:** Keep the dust cap off until greasing is done; refer to [Adjusting the Caster-Pivot Bearing \(page 49\)](#).

7. Remove the hex plug.
8. Thread a grease fitting into the hole.
9. Pump grease into the fitting until it oozes out around the top bearing.
10. Remove the grease fitting in the hole.
11. Install the hex plug and dust cap ([Figure 44](#)).

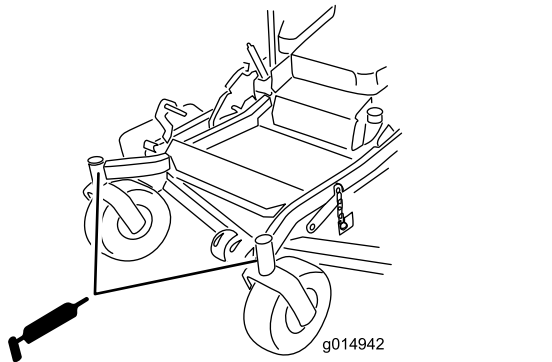


Figure 44

12. Grease the caster-wheel bearings ([Figure 44](#)).

## Lubricating the Caster-Wheel Hubs

**Service Interval:** Yearly

1. Shut off the engine, wait for all moving parts to stop, remove the key, and engage the parking brake.

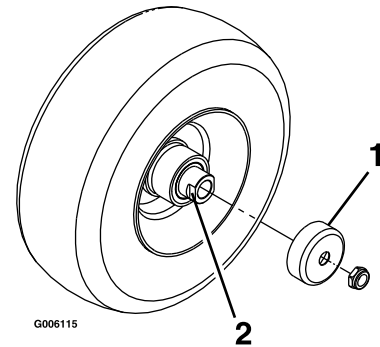


Figure 45

1. Seal guard
2. Spacer nut with wrench flats

2. Raise the mower for access.
3. Remove the caster wheel from the caster forks.
4. Remove the seal guards from the wheel hub.
5. Remove one of the spacer nuts from the axle assembly in the caster wheel.

**Note:** Thread-locking adhesive has been applied to lock the spacer nuts to the axle.

6. Remove the axle (with the other spacer nut still assembled to it) from the wheel assembly.
7. Pry out the seals and inspect bearings for wear or damage and replace if necessary.
8. Pack the bearings with a general-purpose grease.
9. Insert 1 bearing and 1 new seal into the wheel.

**Note:** Replace the seals.

10. If the axle assembly has had both spacer nuts removed (or broken loose), apply a thread-locking adhesive to 1 spacer nut, and thread it onto the axle with the wrench flats facing outward.

**Note:** Do not thread the spacer nut all of the way onto the end of the axle. Leave approximately 3 mm (1/8 inch) from the outer surface of the spacer nut to the end of the axle inside the nut.

11. Insert the assembled nut and axle into the wheel on the side of the wheel with the new seal and bearing.

# Engine Maintenance

## Servicing the Air Cleaner

**Service Interval:** Every 150 hours

Every 300 hours/Yearly (whichever comes first)—Replace the primary air filter (more often in dusty or sandy conditions).

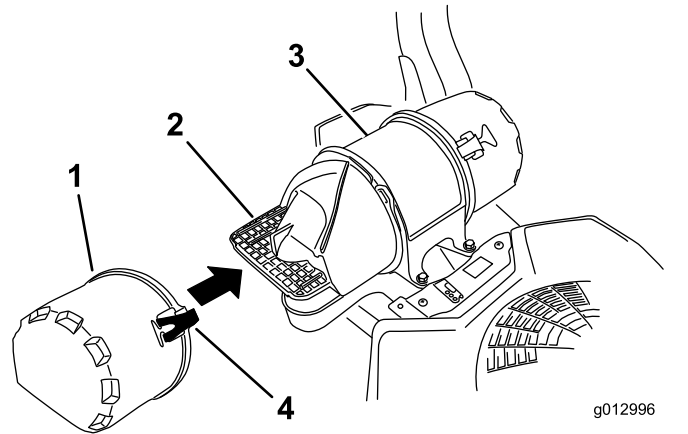
Every 300 hours—Check the inner air filter.

Every 600 hours—Replace the inner air filter.

**Note:** Check the filters more frequently if the operating conditions are extremely dusty or sandy.

## Removing the Filters

1. Disengage the PTO, move the motion-control levers to the NEUTRAL-LOCK position, and set the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Release the latches on the air cleaner and pull the air-inlet cover off the air-cleaner body (Figure 46).
4. Clean the air-inlet screen and cover.
5. Install the air-inlet cover and secure it with the latches (Figure 46).



**Figure 46**

- |                     |                     |
|---------------------|---------------------|
| 1. Air-inlet cover  | 3. Air-cleaner body |
| 2. Air-inlet screen | 4. Latch            |

6. Release the latches on the air cleaner and pull the air-cleaner cover off the air-cleaner body (Figure 47).
7. Clean the inside of the air-cleaner cover with compressed air.
8. Gently slide the primary filter out of the air-cleaner body (Figure 47).

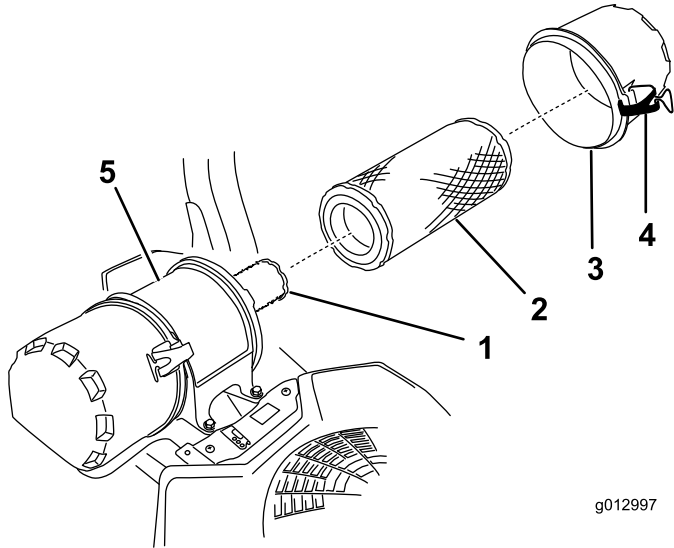
12. With the open end of the wheel facing up, fill the area inside the wheel around the axle full of general-purpose grease.
13. Insert the second bearing and new seal into the wheel.
14. Apply a thread-locking adhesive to the second spacer nut, and thread it onto the axle with the wrench flats facing outward.
15. Torque the nut to 8 to 9 N-m (75 to 80 in-lb), loosen, then torque to 2 to 3 N-m (20 to 25 in-lb).
16. Install the seal guards over the wheel hub, and insert wheel into the caster fork.
17. Install the caster bolt and tighten the nut fully.

**Important:** To prevent seal and bearing damage, check the bearing adjustment often. Spin the caster tire. The tire should not spin freely (more than 1 or 2 revolutions) or have any side play. If the wheel spins freely, adjust the torque on the spacer nut until there is a slight amount of drag. Apply another layer of thread-locking adhesive.

**Note:** Avoid knocking the filter into the side of the body.

9. Remove the inner filter only if you intend to replace it.

**Important:** Never attempt to clean the inner filter. If the safety filter is dirty, then the primary filter is damaged; replace both filters.



**Figure 47**

- |                      |                     |
|----------------------|---------------------|
| 1. Inner filter      | 4. Latch            |
| 2. Primary filter    | 5. Air-cleaner body |
| 3. Air-cleaner cover |                     |

1. If you are installing new filters, check each filter for shipping damage. Do not use a damaged filter.
2. If you are replacing the inner filter, carefully slide it into the filter body (Figure 47).
3. Carefully slide the primary filter over the inner filter (Figure 47).

**Note:** Ensure that the primary filter is fully seated by pushing on its outer rim while installing it.

**Important:** Do not press on the soft inside area of the filter.

4. Install the air cleaner cover and secure the latches (Figure 47).

10. Inspect the primary filter for damage by looking into the filter while shining a bright light on the outside of the filter.

**Note:** Any holes in the filter appear as bright spots. If the filter is damaged, discard it.

## Servicing the Primary Filter

- If the primary filter is dirty, bent, or damaged, replace it.
- Do not clean the primary filter.

## Servicing the Safety Filter

Replace the safety filter, never clean it.

**Important:** Never attempt to clean the safety filter. If the safety filter is dirty, then the primary filter is damaged. Replace both filters.

## Installing the Filters

**Important:** To prevent engine damage, always operate the engine with both air filters and cover installed.

# Servicing the Engine Oil

**Oil Type:** Detergent oil (API service SF, SG, SH, SJ, or SL)

**Crankcase Capacity:** with a filter change, 2.1 L (71 oz); without a filter change, 1.8 L (61 oz)

**Viscosity:** See the table below.

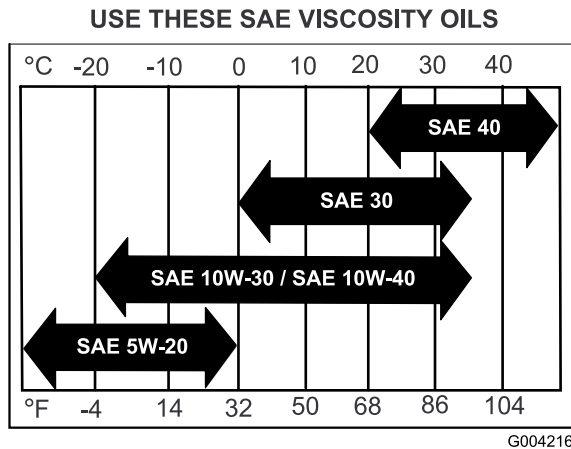


Figure 48

**Note:** Use of multi-grade oils (5W-20, 10W-30, or 10W-40) will increase oil consumption. Check the oil level more frequently when using them.

## Checking the Engine-Oil Level

**Service Interval:** Before each use or daily

**Note:** Check the oil when the engine is cold.

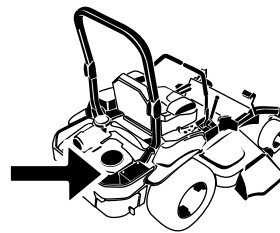
### ⚠ WARNING

Contact with hot surfaces may cause personal injury.

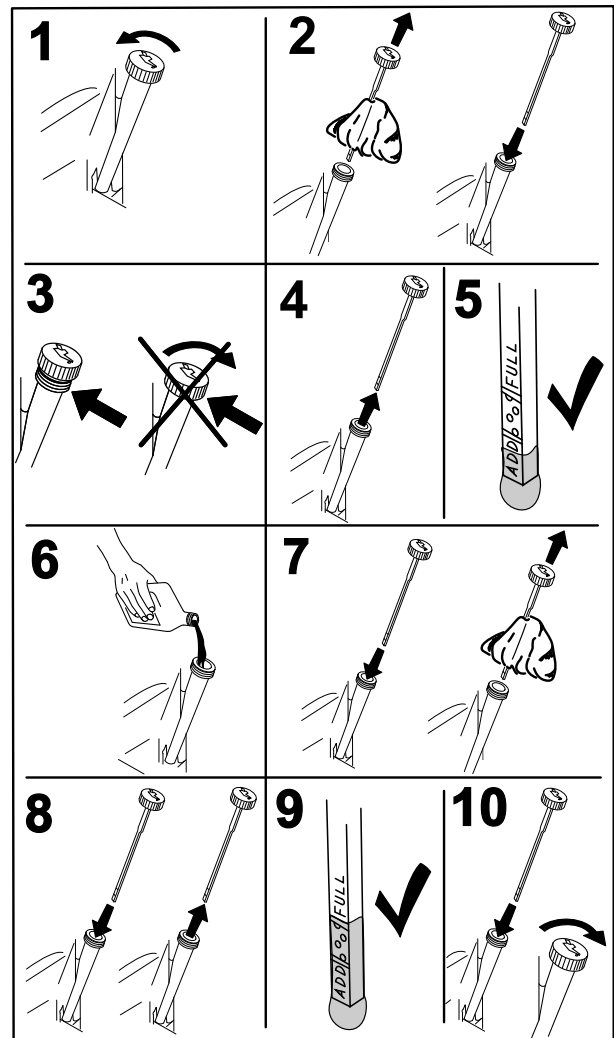
Keep your hands, feet, face, clothing, and other body parts away from the muffler and other hot surfaces.

**Important:** Do not overfill the crankcase with oil because that could damage engine. Do not run engine with oil below the Low mark because the engine may be damaged.

1. Disengage the blade-control switch (PTO), move the motion-control levers to the NEUTRAL-LOCK position, and set the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position (Figure 49).



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Figure 49



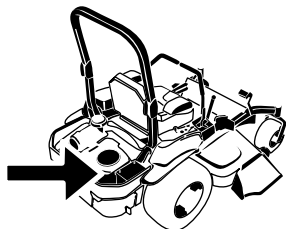
# Changing the Engine Oil

**Service Interval:** After the first 8 hours

Every 100 hours (more often in dirty or dusty conditions).

**Note:** Dispose of the used oil at a recycling center.

1. Start the engine and let it run for 5 minutes.  
**Note:** This warms the oil so that it drains better.
2. Park the machine so that the rear is slightly lower than the front to ensure that the oil drains completely.
3. Disengage the blade-control switch (PTO), move the motion-control levers to the NEUTRAL-LOCK position, and set the parking brake.
4. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position (Figure 50).



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5. Slowly pour approximately 80% of the specified oil into the filler tube and slowly add the additional oil to bring it to the **Full** mark (Figure 51).

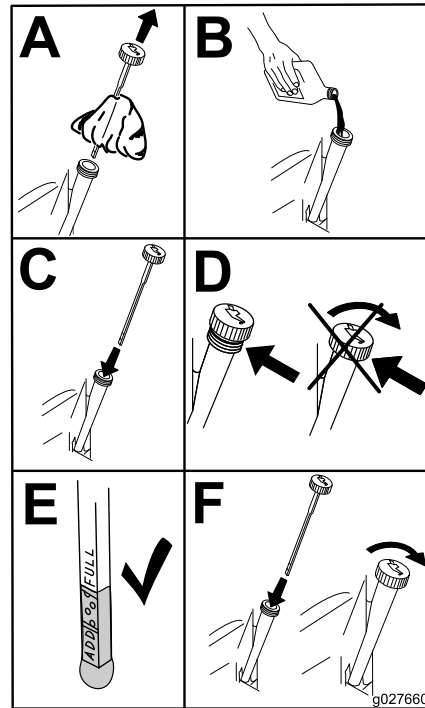


Figure 51

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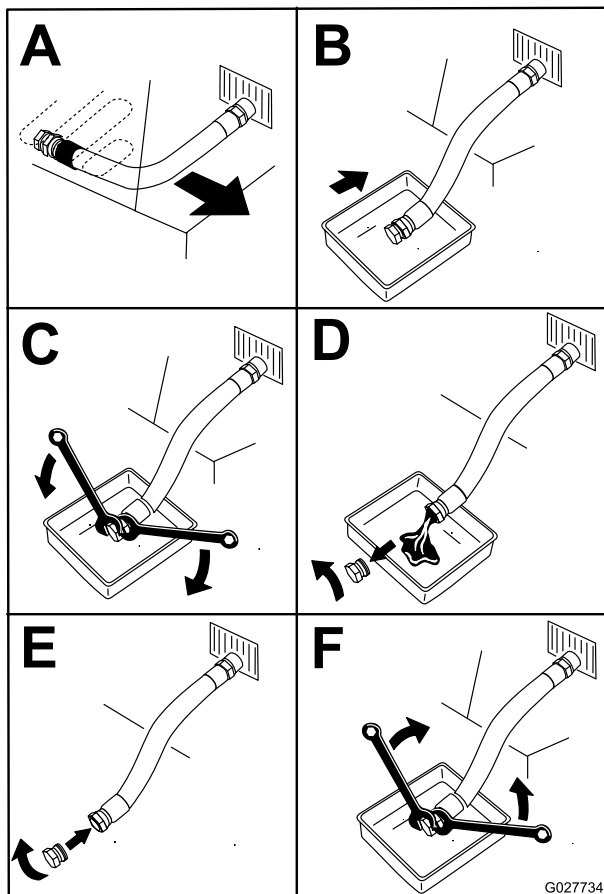


Figure 50

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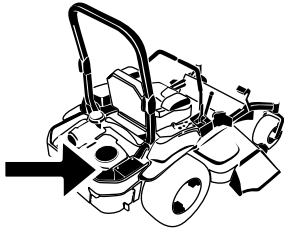
6. Start the engine and drive to a flat area.
7. Check the oil level again.

## Changing the Engine-Oil Filter

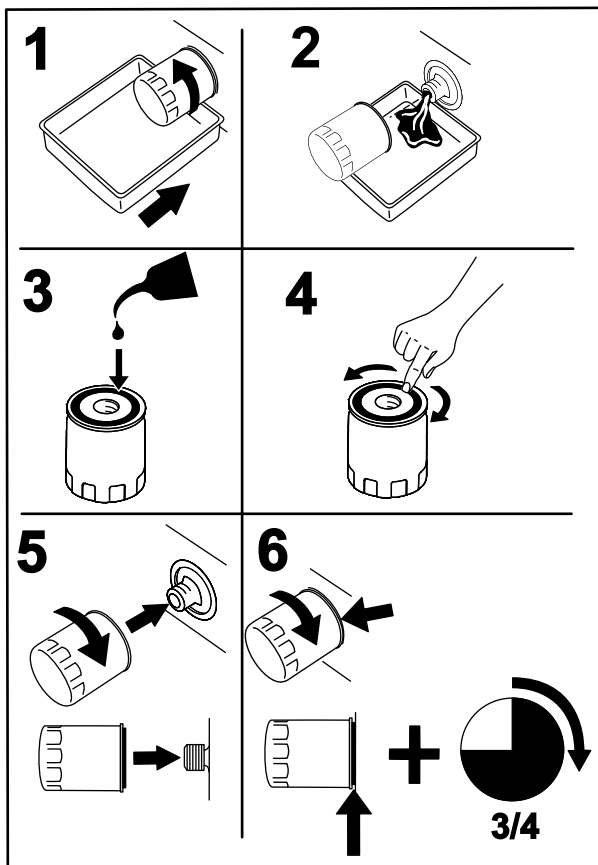
**Service Interval:** Every 200 hours

**Note:** Change the engine-oil filter more frequently when operating conditions are extremely dusty or sandy.

1. Drain the oil from the engine; refer to [Changing the Engine Oil \(page 41\)](#).
2. Change the engine-oil filter ([Figure 52](#)).



G008804  
g008804



G008748  
g008748

Figure 52

**Note:** Ensure that the oil-filter gasket touches the engine, and then the oil filter an extra 3/4 turn.

3. Fill the crankcase with the proper type of new oil; refer to [Changing the Engine Oil \(page 41\)](#).

## Servicing the Spark Plugs

**Service Interval:** Every 500 hours/Yearly (whichever comes first)—Check and gap the spark plug.

Make sure that the air gap between the center and side electrodes is correct before installing the spark plugs. Use a spark-plug wrench for removing and installing the spark plugs and a gapping tool/feeler gauge to check and adjust the air gap. Install new spark plugs if necessary.

**Type :** Champion® XC12YC, Champion® Platinum 3071 or equivalent

**Air Gap:** 0.76 mm (0.030 inch)

## Removing the Spark Plugs

1. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
2. Disengage the PTO, move the motion-control levers to the NEUTRAL-LOCK position, and set the parking brake.
3. Remove the left hydraulic-unit shroud in the order listed with [Figure 53](#).

**Note:** This gives you access to the front spark plug.

5. Install the left hydraulic-unit shroud (Figure 53).

## Checking the Spark Plugs

**Important:** Replace the spark plugs when they have a black coating, worn electrodes, an oily film, cracks, or if reuse is questionable.

If you see light brown or gray on the insulator, the engine is operating properly. A black coating on the insulator usually means that the air cleaner is dirty.

Set the gap to 0.76 mm (0.030 inch).

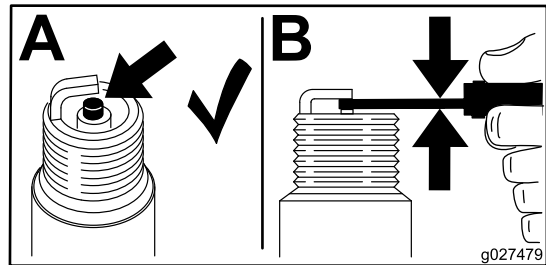


Figure 55

g027479

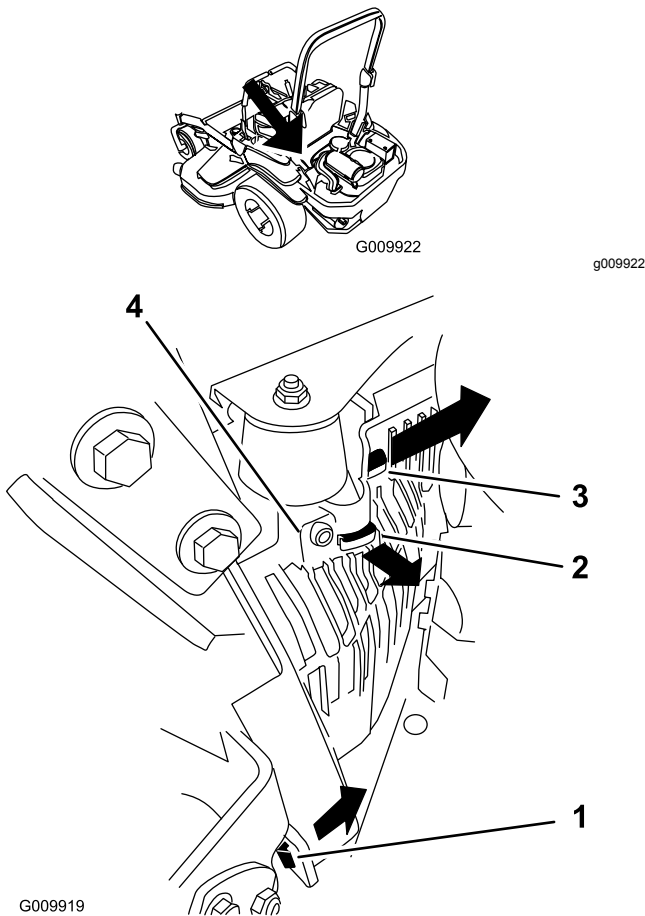


Figure 53

g009919

1. Pull this tab out to the side in the direction of the arrow.
2. Pull the shroud off this frame tab in the direction of the arrow.
3. Pull the shroud off this frame tab in the direction of the arrow.
4. Shroud

4. Remove the spark plugs.

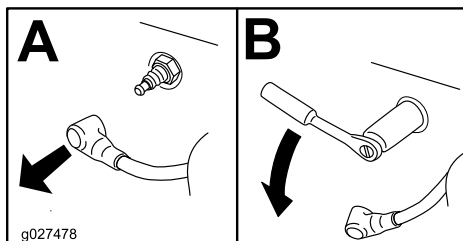


Figure 54

g027478

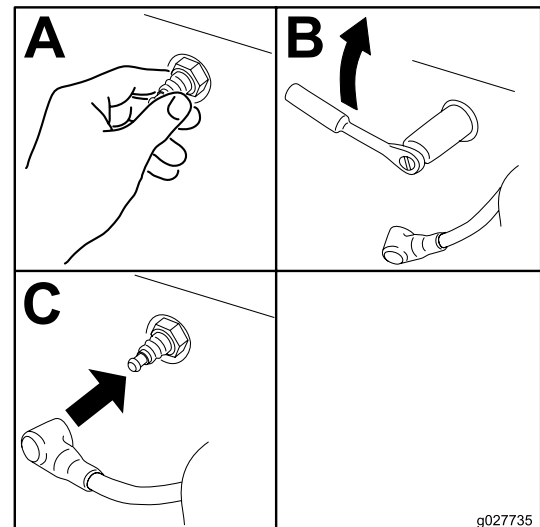


Figure 56

g027735

# Checking the Spark Arrester

## For a Model with a Spark Arrester

Service Interval: Every 50 hours

### **⚠ WARNING**

Hot exhaust system components may ignite gasoline vapors even after the engine is stopped. Hot particles exhausted during engine operation may ignite flammable materials. Fire may result in personal injury or property damage.

**Do not fuel or run the engine unless the spark arrester is installed.**

1. Shut off the engine, wait for all moving parts to stop, remove the key, and engage the parking brake.
2. Wait for the muffler to cool.
3. If there are any breaks in the screen or welds, replace the arrester.
4. If the screen is plugged, remove the arrester and shake loose particles out of the arrester, and clean the screen with a wire brush (soak in solvent if necessary).
5. Install the arrester on the exhaust outlet.

# Fuel System Maintenance

### **⚠ WARNING**

Fuel system components are under high pressure. The use of improper components can result in system failure, gasoline leakage, and possible explosion.

Use only approved fuel lines and fuel filters.

## Servicing the Electronic Fuel Injection System

This machine contains an electronic fuel injection (EFI) system. It controls the fuel flow under different operating conditions.

The electronic control unit (ECU) continuously monitors the operation of the EFI system.

If a problem or fault within the system is detected, the malfunction-indicator light (MIL) is illuminated. The MIL is the red light located in the right console panel.

Once the MIL illuminates, initial trouble shooting checks should be made. Refer to the MIL section under [Troubleshooting \(page 69\)](#).

If these checks do not correct the problem, further diagnosis and servicing by an Authorized Service Dealer is necessary.

## Replacing the Low-Pressure Fuel Filter

**Service Interval:** Every 200 hours (more often in dirty or dusty conditions).

The fuel filter is located near the engine on the front or rear side of the engine.

1. Disengage the PTO, move the motion-control levers to the NEUTRAL-LOCK position, and set the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Allow the machine to cool down.
4. Close the fuel-shutoff valve under the seat ([Figure 57](#)).

# Electrical System Maintenance

## Servicing the Battery

Service Interval: Monthly

### ⚠ DANGER

Battery electrolyte contains sulfuric acid, which is a deadly poison and causes severe burns.

Do not drink electrolyte and avoid contact with skin, eyes, or clothing. Wear safety glasses to shield your eyes and wear rubber gloves to protect your hands.

## Removing the Battery

### ⚠ WARNING

Battery terminals or metal tools could short against metal machine components, causing sparks. Sparks can cause the battery gasses to explode, resulting in personal injury.

- When removing or installing the battery, do not allow the battery terminals to touch any metal parts of the machine.
- Do not allow metal tools to short between the battery terminals and metal parts of the machine.

### ⚠ WARNING

Incorrect battery cable routing could damage the machine and cables, causing sparks. Sparks can cause the battery gasses to explode, resulting in personal injury.

- Always disconnect the negative (black) battery cable before disconnecting the positive (red) cable.
- Always connect the positive (red) battery cable before connecting the negative (black) cable.

1. Disengage the blade-control switch (PTO), move the motion-control levers to the NEUTRAL-LOCK position, and set the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Remove the battery as shown in [Figure 58](#).

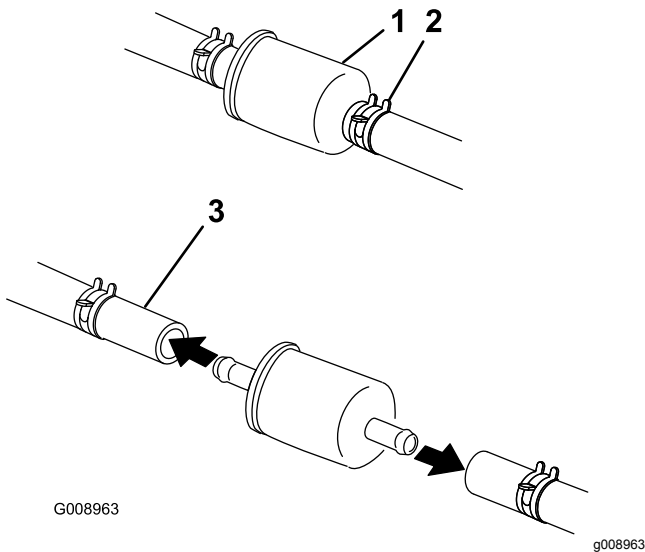


Figure 57

1. Fuel filter
2. Hose clamp
3. Fuel line

5. Squeeze the ends of the hose clamps together and slide them away from the filter ([Figure 57](#)).
6. Remove the filter from the fuel lines.
7. Install a new filter and move the hose clamps close to the filter ([Figure 57](#)).
8. Open the fuel-shutoff valve.

**Important:** Install the fuel-line hoses and secure them with plastic ties the same as they were originally installed at the factory to keep the fuel line away from components that could cause fuel line damage.

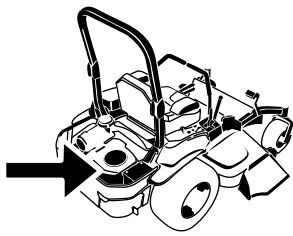
## Servicing the High-Pressure Fuel Filter

Do not attempt to service the high-pressure fuel filter. The high-pressure filter is integrated within the fuel pump module. The fuel filter and other components inside the fuel pump module are not serviceable. **Do not** attempt to open the fuel-pump module.

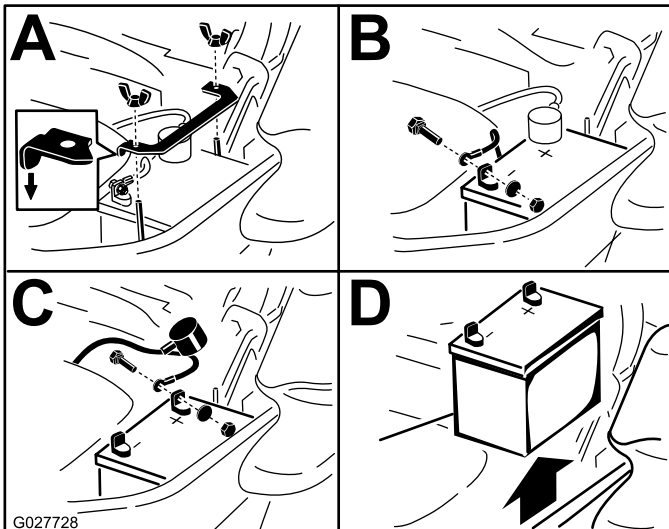
Ensure that an Authorized Service Dealer replaces the fuel-pump module with the high-pressure fuel filter.

## Servicing the Fuel Tank

Do not attempt to drain the fuel tank. Ensure that an Authorized Service Dealer drains the fuel tank.



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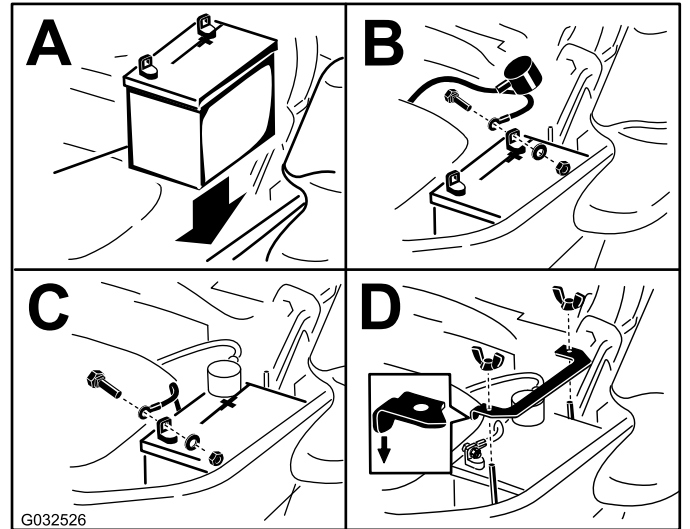
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Figure 58

## Installing the Battery

**Note:** Position battery in the tray with the terminal posts opposite from the hydraulic tank (Figure 59).



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g032526

Figure 59

## Charging the Battery

### ⚠ WARNING

Charging the battery produces gasses that can explode.

Never smoke near the battery and keep sparks and flames away from battery.

**Important:** Always keep the battery fully charged (1.265 specific gravity). This is especially important to prevent battery damage when the temperature is below 0°C (32°F).

1. Charge battery for 10 to 15 minutes at 25 to 30 A or for 30 minutes at 10 A.
2. When the battery is fully charged, unplug the charger from the electrical outlet, then disconnect the charger leads from the battery posts (Figure 60).
3. Install the battery in the machine and connect the battery cables; refer to [Installing the Battery](#) (page 46).

**Note:** Do not run the machine with the battery disconnected; electrical damage may occur.

# Drive System Maintenance

## Checking the Seat Belt

**Service Interval:** Before each use or daily

Visually inspect seat belt for wear, cuts, and proper operation of retractor and buckle. Replace the seat belt before operating the machine if the belt is damaged.

## Checking the Rollover-Protection System (ROPS) Knobs

**Service Interval:** Before each use or daily

### ⚠ WARNING

**To avoid injury or death from rollover, keep the roll bar in the fully raised locked position and use the seat belt.**

**Ensure the seat is secured to the machine.**

Check that both the mounting hardware and the knobs are in good working condition. Make sure that the knobs are fully engaged with the ROPS in the raised position. You may need to push the upper hoop of the roll bar forward or pull it rearward to fully engage both knobs (Figure 62).

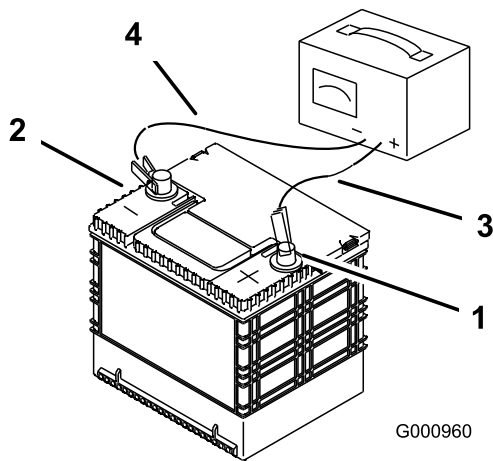


Figure 60

- |                          |                           |
|--------------------------|---------------------------|
| 1. Positive battery post | 3. Red (+) charger lead   |
| 2. Negative battery post | 4. Black (-) charger lead |

## Servicing the Fuses

The electrical system is protected by fuses. It requires no maintenance, however, if a fuse blows check the component/circuit for a malfunction or short.

1. The fuses are located on right console next to the seat (Figure 61).
2. To replace the fuses, pull out the fuse to remove it.
3. Install a new fuse (Figure 61).

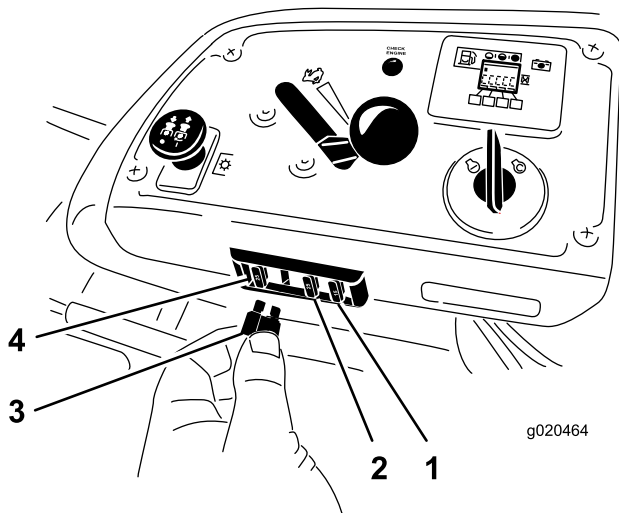
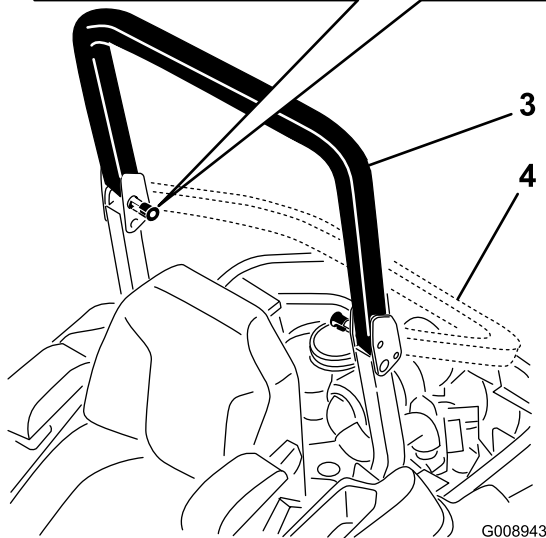
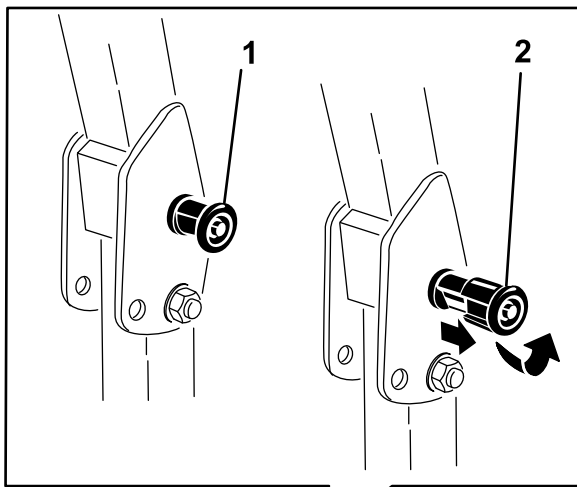


Figure 61

- |                            |              |
|----------------------------|--------------|
| 1. Optional accessory—15 A | 4. Main—25 A |
| 2. Charge—25 A             | 5. Console   |
| 3. PTO—10 A                |              |



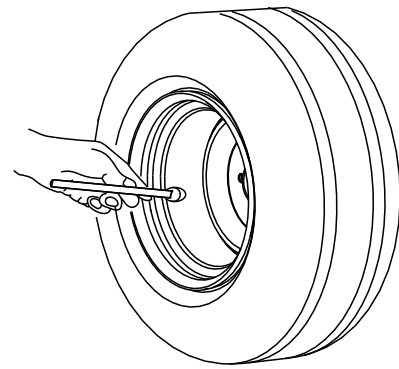


**Figure 62**

1. ROPS knob (locked position)
2. Pull the ROPS knob out and rotate it 90 degrees to change the roll bar position.
3. Roll bar in the upright position
4. Roll bar in the folded position

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g008943



G001055

g001055

**Figure 63**

## Checking the Wheel-Lug Nuts

Check and torque the wheel lug nuts to 122 to 129 N-m (90 to 95 ft-lb).

## Checking the Wheel Hub Slotted Nut

**Service Interval:** After the first 100 hours

Every 500 hours

Check and ensure that the torque of the slotted nut is 286 to 352 N-m (211 to 260 ft-lb).

**Note:** Do not use anti-seize compound on the wheel hub.

## Adjusting the Tracking

Refer to [Adjusting the Control-Handle Position \(page 56\)](#).

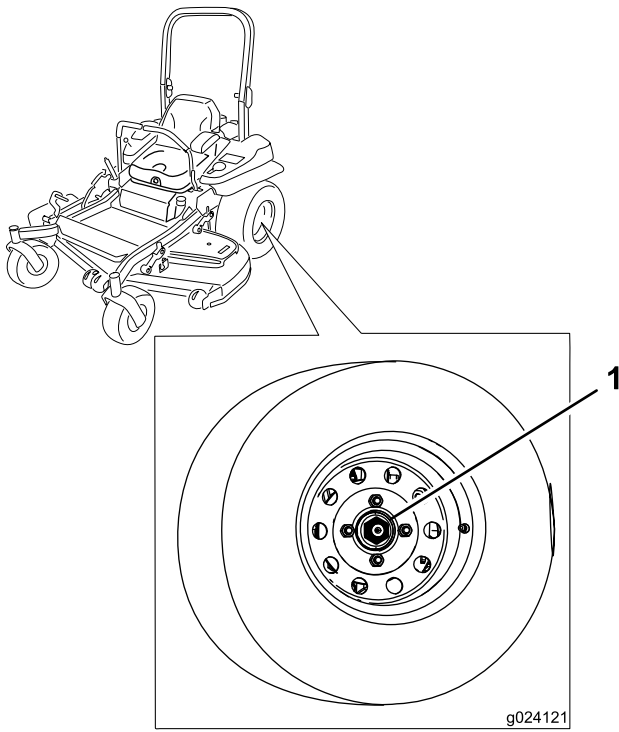
## Checking the Tire Pressure

**Service Interval:** Every 50 hours/Monthly (whichever comes first)

Maintain the air pressure in the rear tires at 90 kPa (13 psi). Uneven tire pressure can cause uneven cut. Check the tires when they are cold to get the most accurate pressure reading.

**Note:** The front tires are semi-pneumatic tires and do not require air-pressure maintenance.





**Figure 64**

1. Slotted nut

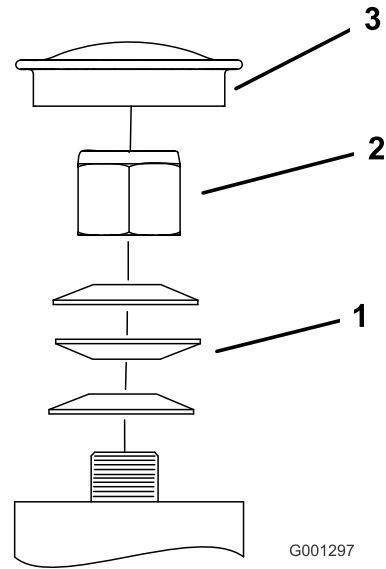
## Adjusting the Caster-Pivot Bearing

**Service Interval:** Every 500 hours/Yearly (whichever comes first)

1. Disengage the blade-control switch (PTO), move the motion-control levers to the NEUTRAL-LOCK position, and set the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Remove the dust cap from caster and tighten the locknut ([Figure 65](#)).
4. Tighten the locknut until the spring washers are flat, and then back off a 1/4 turn to properly set the preload on the bearings ([Figure 65](#)).

**Important:** Ensure that the spring washers are installed correctly as shown in [Figure 65](#).

5. Install the dust cap ([Figure 65](#)).

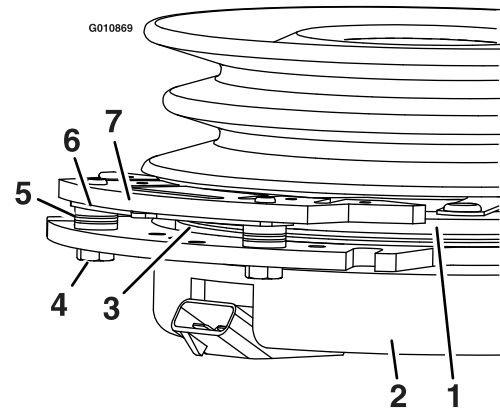


**Figure 65**

1. Spring washers
2. Locknut
3. Dust cap

## Using the Clutch Shim

Some later model year units have been built with clutches that contain a brake shim. When the clutch brake has worn to the point where the clutch no longer engages consistently, you can remove the shim to extend the life of the clutch.



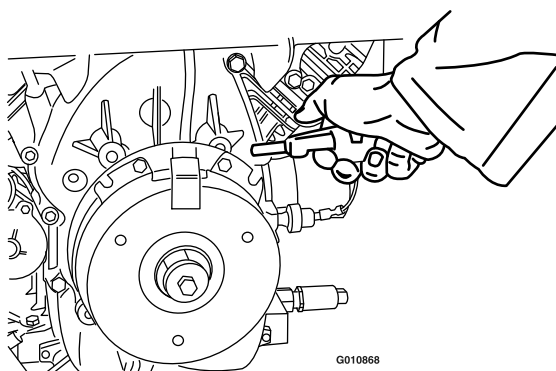
**Figure 66**

1. Armature
2. Field shell
3. Rotor
4. Brake-mounting bolt
5. Brake spacer
6. Re-gap shim
7. Brake pole

## Removing the Clutch Shim

1. Shut off the engine, wait for all moving parts to stop, remove the key, engage the parking brake, and allow the machine to cool completely before starting these instructions.

2. Using an air compressor, blow out any debris from under the brake pole and around the brake spacers.



**Figure 67**

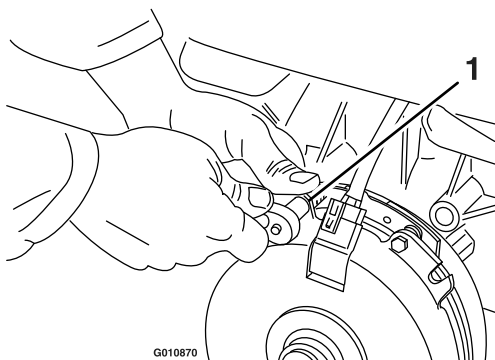
3. Check the condition of the wire-harness leads, connectors, and terminals.
4. Verify that 12 V is present at the clutch connector when the PTO switch is engaged.

**Note:** Clean or repair as necessary.

5. Measure the gap between the rotor and armature. If the gap is greater than 1 mm (0.04 inch), proceed with the following steps:

- A. Loosen both brake-mounting bolts 1/2 to 1 full turn as shown below.

**Note:** Do not remove the brake pole from the field shell/armature. The brake pole has worn to match the armature and needs to continue to match after you remove the shim to ensure the proper brake torque.

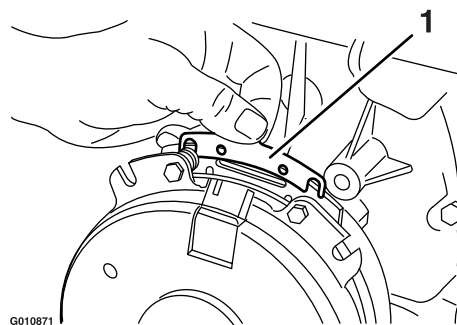


**Figure 68**

1. Brake-mounting bolt

- B. Using needle-nose pliers, or by hand, hold the tab and remove the shim.

**Note:** Do not discard the shim until you have confirmed that the clutch is functioning properly.

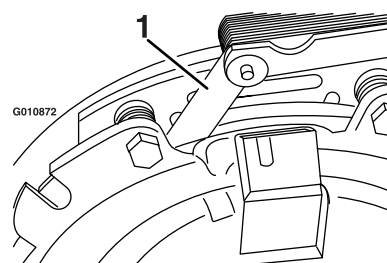


**Figure 69**

1. Shim

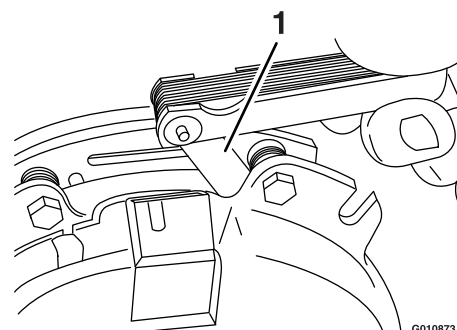
- C. Using a pneumatic line, blow out any debris from under the brake pole and around the brake spacers.
- D. Torque each bolt (M6 x 1) to 13 N-m (10 ft-lb) +/-0.7 N-m (0.5 ft-lb).
- E. Using a 0.25 mm (0.01 inch) thick feeler gauge, verify that a gap is present between the rotor and the armature face on both sides of the brake pole as shown.

**Note:** Due to the way the rotor and the armature faces wear (peaks and valleys), it is sometimes difficult to measure the gap accurately.



**Figure 70**

1. Feeler gauge



**Figure 71**

1. Feeler gauge

- If the gap is less than 0.25 mm (0.01 inch), then install the shim and refer to [Troubleshooting \(page 69\)](#).
- If the gap is sufficient, proceed to the safety check in step **F**.

F. Perform the following safety check:

- i. Sit on the seat and start the engine.
- ii. Ensure that the blades do not engage with the PTO switch in the OFF position, and that the clutch is disengaged.

If the clutch does not disengage, install the shim again and refer to [Troubleshooting \(page 69\)](#).

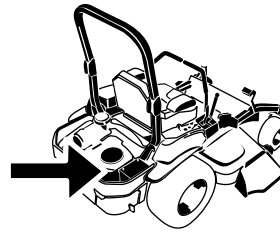
- iii. Engage and disengage the PTO switch 10 consecutive times to ensure that the clutch is functioning properly.

## Cooling System Maintenance

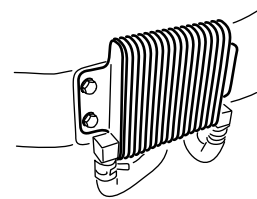
### Cleaning the Engine Screen and Engine-Oil Cooler

**Service Interval:** Before each use or daily

Remove any buildup of grass, dirt, or other debris from the oil cooler ([Figure 72](#)).



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G009191

g009191

**Figure 72**

Before each use, remove any buildup of grass, dirt, or other debris from the engine screen. This helps ensure adequate cooling, correct the engine speed, and reduces the possibility of overheating and mechanical damage to the engine ([Figure 73](#)).

### Cleaning the Engine-Cooling Fins and Shrouds

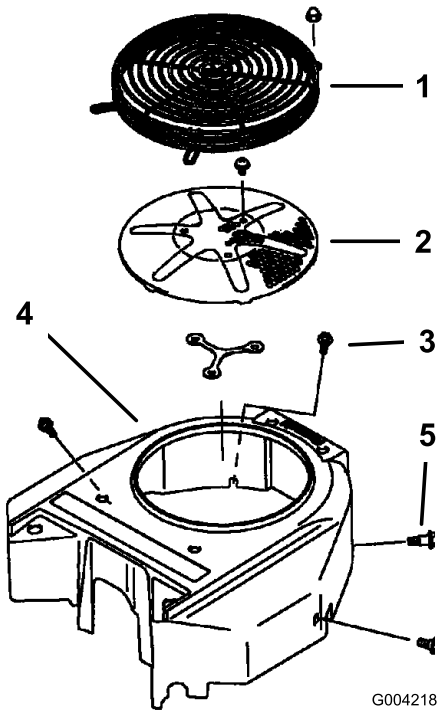
**Service Interval:** Every 100 hours/Yearly (whichever comes first)

1. Disengage the PTO and set the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Remove the air-intake screen, the recoil starter, and the fan housing ([Figure 73](#)).
4. Clean the debris and grass from the engine parts.
5. Install the air-intake screen, the recoil starter, and the fan housing ([Figure 73](#)).

# Checking and Cleaning the Hydraulic-Unit Shrouds

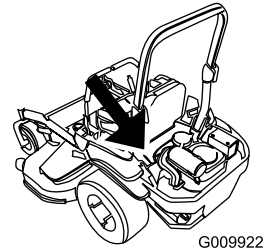
**Service Interval:** Before each use or daily

1. Disengage the PTO and set the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Move the seat forward.
4. Clean the debris and grass from the hydraulic-unit shrouds (Figure 74).
5. Position the seat.

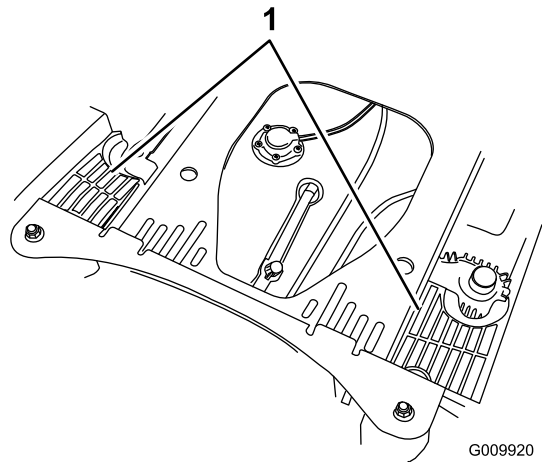


**Figure 73**

- |                             |                |
|-----------------------------|----------------|
| 1. Engine guard             | 4. Fan housing |
| 2. Engine air-intake screen | 5. Screw       |
| 3. Bolt                     |                |



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**Figure 74**

1. Hydraulic-unit shrouds

# Brake Maintenance

## Adjusting the Parking Brake

**Service Interval:** After the first 100 hours

Every 500 hours thereafter

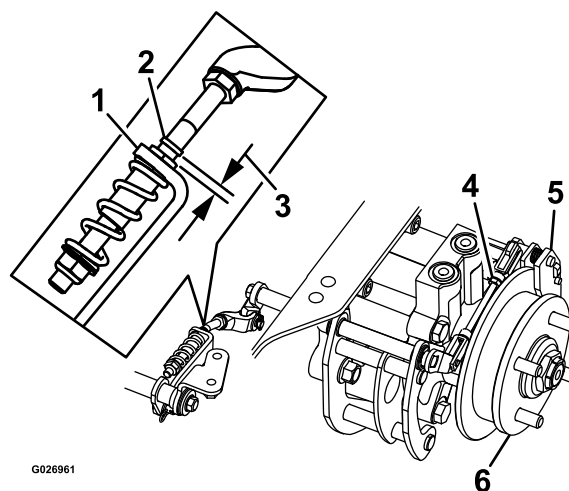
**Note:** Follow this procedure after you remove or replace a brake component.

1. Move the machine onto a level surface.
2. Disengage the blade-control switch (PTO), move the motion-control levers to the NEUTRAL-LOCK position, and engage the parking brake.
3. Shut off the engine, wait for all moving parts to stop, and remove the key.
4. Raise the back of the machine up and support the machine with jack stands.

### **⚠ DANGER**

**Mechanical or hydraulic jacks may fail to support machine and cause a serious injury.**

- Use jack stands when supporting the machine.
  - Do not use hydraulic jacks.
5. Remove the rear tires from the machine.
  6. Remove any debris from the brake area.
  7. Rotate the drive wheel release handle to the released position. Refer to [Using the Drive-Wheel-Release Valves \(page 30\)](#).
  8. Check to see if there is a visible gap between the L-bracket and the linkage stop ([Figure 75](#)).



**Figure 75**

Left Side Shown

- |                 |                          |
|-----------------|--------------------------|
| 1. L-bracket    | 4. Rear linkage assembly |
| 2. Linkage stop | 5. Caliper               |
| 3. Gap          | 6. Wheel hub             |
- 
9. Disengage the parking brake; the lever should be in the down position.
  10. Turn the wheel hub by hand in both directions relative to the caliper; the wheel hub should move freely between the caliper.
  11. If a gap is needed or the wheel hub does not move freely, do the following steps:
    - A. Disengage the parking brake.
    - B. Disconnect and fine-tune the rear linkage assembly:
      - Shorten the link to create a gap.
      - Lengthen the link to allow wheel hub movement.
    - C. Connect the rear linkage assembly.
  12. Engage the parking brake and check the gap.
  13. Repeat steps 9 through 13 until you obtain a visible gap and the wheel hub rotates freely.
  14. Repeat this procedure for the brake on the opposite side.
  15. Rotate the drive wheel release handle to the operating position. Refer to [Using the Drive-Wheel-Release Valves \(page 30\)](#).
  16. Install the rear tires and torque the lug nuts. Refer to [Checking the Wheel-Lug Nuts \(page 48\)](#).
  17. Remove the jack stands.

# Belt Maintenance

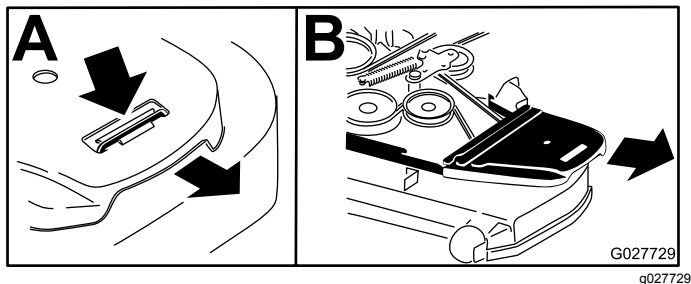
## Inspecting the Belts

**Service Interval:** Every 50 hours

Check the belts for squealing when the belt is rotating; the blades are slipping when cutting grass; frayed belt edges; burn marks; and cracks, which are signs of a worn mower belt. Replace the mower belt if any of these conditions occur.

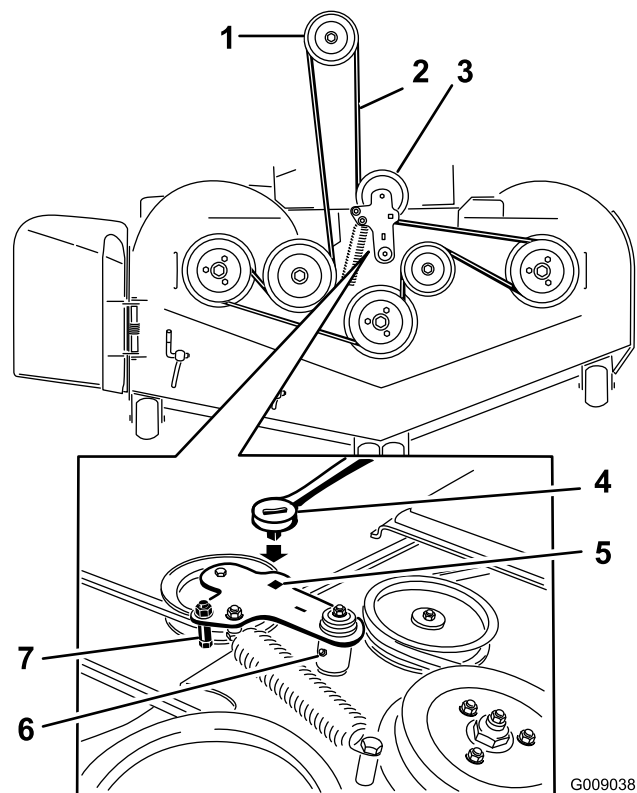
## Replacing the Mower Belt

1. Disengage the PTO, move the motion-control levers to the NEUTRAL-LOCK position, and set the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Lower the mower to the 76 mm (3 inches) height-of-cut position.
4. Remove the belt covers (Figure 76).



**Figure 76**

5. Use a ratchet in the square hole in the idler arm to remove tension on the idler spring (Figure 77).
6. Remove the belt from the mower-deck pulleys.
7. Remove the belt guide on the spring-loaded idler arm (Figure 77).
8. Remove the existing belt.
9. Install the new belt around the mower pulleys and the clutch pulley under the engine (Figure 77).



**Figure 77**

- |                               |   |
|-------------------------------|---|
| 1. Clutch pulley              | 5. Square hole in the idler arm for the ratchet |
| 2. Mower belt                 | 6. Idler-grease fitting                         |
| 3. Spring-loaded idler pulley | 7. Belt guide                                   |
| 4. Ratchet                    |   |

10. Install the belt guide on the idler arm (Figure 77).
11. Using the ratchet in the square hole, install the idler spring (Figure 77).

**Note:** Ensure that the spring ends are seated in the anchor grooves.

12. Install the belt covers (Figure 78).

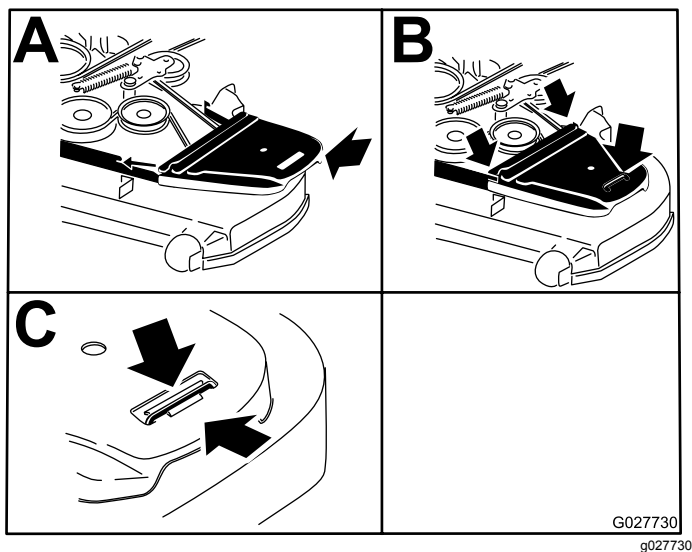


Figure 78

## Replacing the Hydraulic Pump-Drive Belt

1. Disengage the PTO and set the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Remove the mower belt; refer to [Replacing the Mower Belt \(page 54\)](#).
4. Raise the machine and support it with jack stands ([Figure 79](#)).

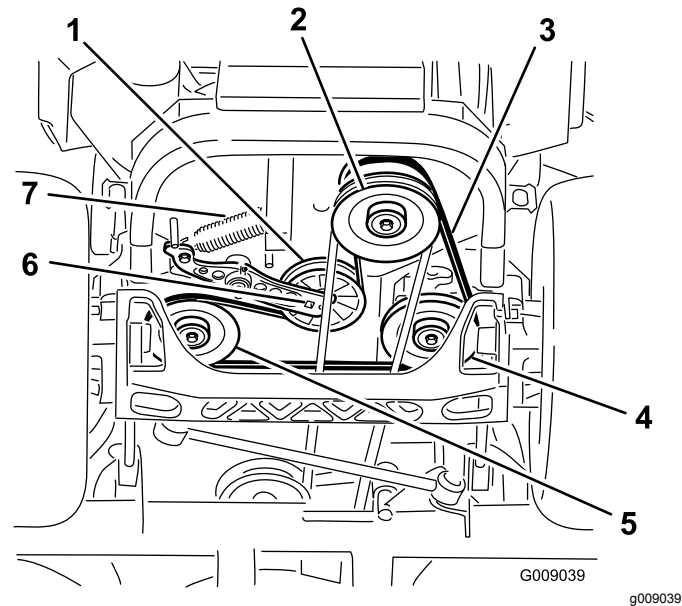


Figure 79

- |                                |                                 |
|--------------------------------|---------------------------------|
| 1. Idler pulley                | 5. Left hydraulic-pump pulley   |
| 2. Clutch pulley               | 6. Square hole in the idler arm |
| 3. Pump-drive belt             | 7. Idler spring                 |
| 4. Right hydraulic-pump pulley |                                 |

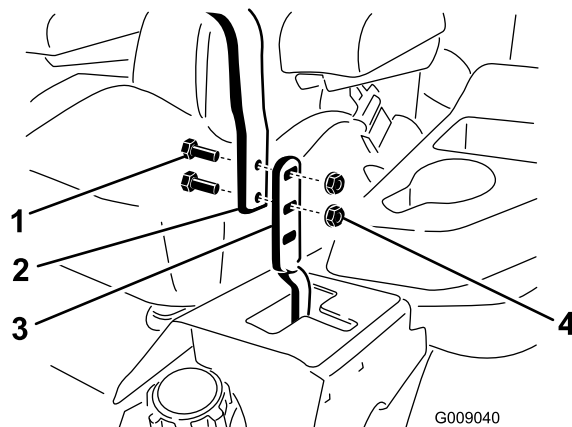
5. Use a ratchet in the square hole in the idler arm to remove the idler spring ([Figure 79](#)).
6. Unhook the idler spring from the frame ([Figure 79](#)).

# Controls System Maintenance

## Adjusting the Control-Handle Position

There are 2 height positions for the control levers—high and low. Remove the bolts to adjust the height for the operator.

1. Disengage the PTO, move the motion-control levers to the NEUTRAL-LOCK position, and set the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Loosen the bolts and flange nuts installed in the levers ([Figure 80](#)).
4. Align the levers in the front-to-rear position by bringing the levers together to the NEUTRAL position, and slide them until they are aligned, then tighten the bolts ([Figure 81](#)).



**Figure 80**

- |           |                  |
|-----------|------------------|
| 1. Bolt   | 3. Control lever |
| 2. Handle | 4. Nut           |

7. Remove the belt from the hydraulic unit drive pulleys and the engine pulley.
8. Install the new belt around engine pulley and the 2 drive pulleys.
9. Using a ratchet in the square hole in the idler arm, install the idler spring to the frame ([Figure 79](#)).
10. Install the mower belt; refer to [Replacing the Mower Belt \(page 54\)](#).



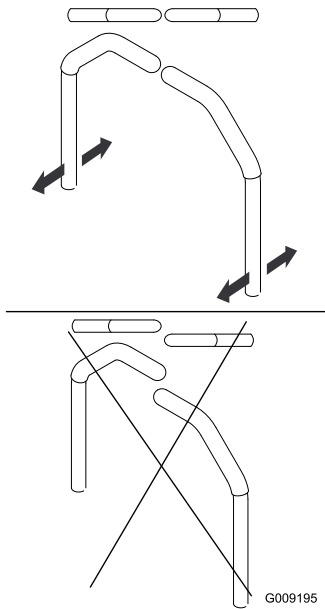


Figure 81

5. If the ends of the levers hit against each other, refer to [Adjusting the Motion Control Neutral-Lock Pivot](#) (page 58).
6. Repeat to adjust the control levers.

## Adjusting the Motion-Control Linkage

Located on either side of the fuel tank, below the seat are the pump-control linkages. Rotating the pump linkage with a 1/2-inch wrench allows fine tuning adjustments so that the machine does not move in neutral. Any adjustments should be made for neutral positioning only.

### ⚠ WARNING

The engine must be running and drive wheels turning so that you can perform the motion-control adjustment. Contact with moving parts or hot surfaces may cause personal injury.

Keep your fingers, hands, and clothing clear of rotating components and hot surfaces.

1. Prior to starting the engine, push the deck-lift pedal, and remove the height-of-cut pin.
2. Lower deck to the ground.
3. Raise the rear of machine up and support it with jack stands (or equivalent support).

**Note:** Raise the machine just high enough to allow drive wheels to turn freely.

4. Remove the electrical connection from the seat safety switch, located under the bottom cushion of the seat.

**Note:** The switch is a part of the seat assembly.

5. **Temporarily** install a jumper wire across the terminals in the connector of the main wiring harness.
6. Start the engine and run it at full throttle and release the brake.
- Note:** The brake must be engaged and the motion-control levers must be out to start the engine. You do not have to be in the seat because of the jumper wire being used.
7. Run the unit for at least 5 minutes with the drive levers at full forward speed to bring the hydraulic fluid up to the operating temperature.

**Note:** The motion-control levers need to be in neutral while making any necessary adjustments.

8. Bring the motion-control levers into the NEUTRAL position.
9. Adjust the pump control rod lengths by rotating the double nuts on the rod in the appropriate direction until the wheels slightly creep in reverse ([Figure 82](#)).

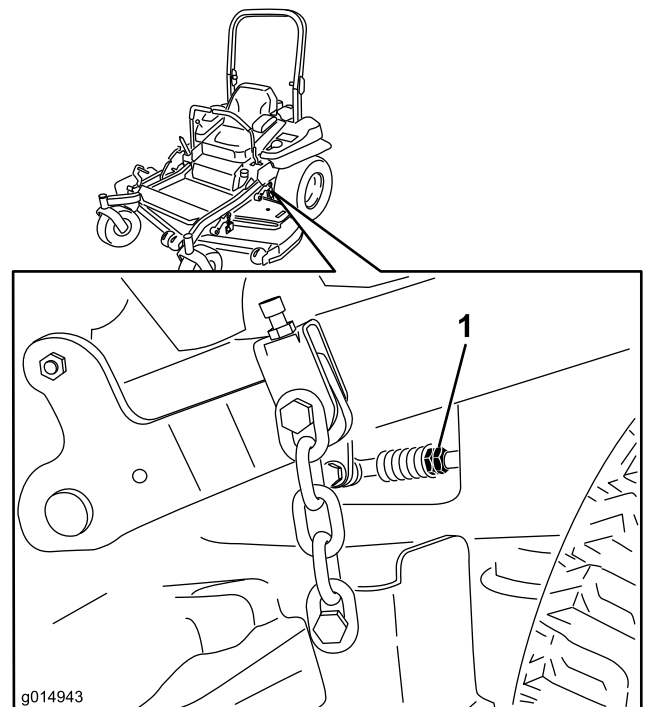


Figure 82

1. Double nuts

10. Move the motion-control levers to the reverse position and while applying slight pressure to

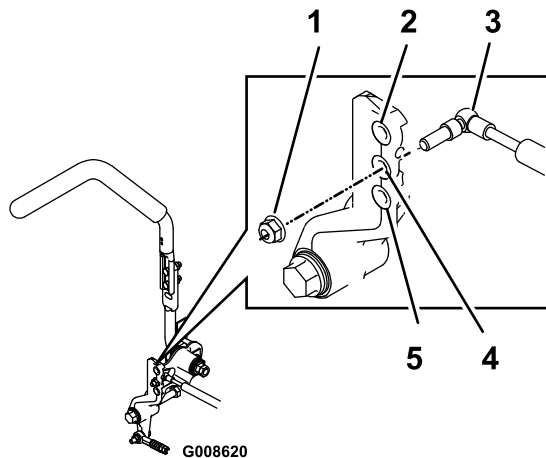
the lever, allow the reverse-indicator springs to bring the levers back to neutral.

**Note:** The wheels must stop turning or slightly creep in reverse.

11. Shut off the unit, remove the jumper wire from the wire harness, and plug the connector into the seat switch.
12. Remove the jack stands.
13. Raise the deck and install the height-of-cut pin.
14. Check that the machine does not creep in neutral with the park brakes disengaged.

## Adjusting the Motion-Control Damper

You can adjust the top damper mounting bolt to obtain a more desired motion-control lever resistance. See [Figure 83](#) for mounting options.



**Figure 83**

Right Control Shown

1. Torque the locknut to 23 N-m (17 ft-lb). The bolt must protrude past the end of the locknut after torquing.
2. Most resistance (firmest feel)
3. Damper
4. Medium resistance (medium feel)
5. Least resistance (softest feel)

## Adjusting the Motion Control Neutral-Lock Pivot

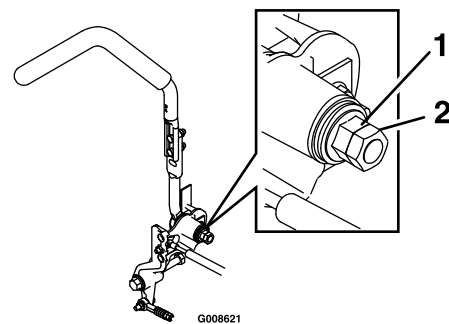
You can adjust the flanged nut to obtain a more desired motion-control lever resistance when moving it to the NEUTRAL-LOCK position. See [Figure 84](#) for adjustment options.

1. Loosen the jam nut.
2. Tighten or loosen the flanged nut to the desired feel.

**Note:** For more resistance, tighten the flanged nut.

**Note:** For less resistance, loosen the flanged nut.

3. Tighten the jam nut.



**Figure 84**

1. Flanged nut
2. Jam nut

# Hydraulic System Maintenance

## Servicing the Hydraulic System

**Hydraulic Fluid Type:** Toro® HYPR-OIL™ 500 hydraulic fluid or Mobil® 1 15W-50.

**Important:** Use the specified fluid. Other fluids could cause system damage.

**Each Hydraulic System Fluid Capacity:** 1.5 L (52 oz) per side with filter change

## Checking the Hydraulic Fluid

**Service Interval:** Every 50 hours—Check the hydraulic fluid level.

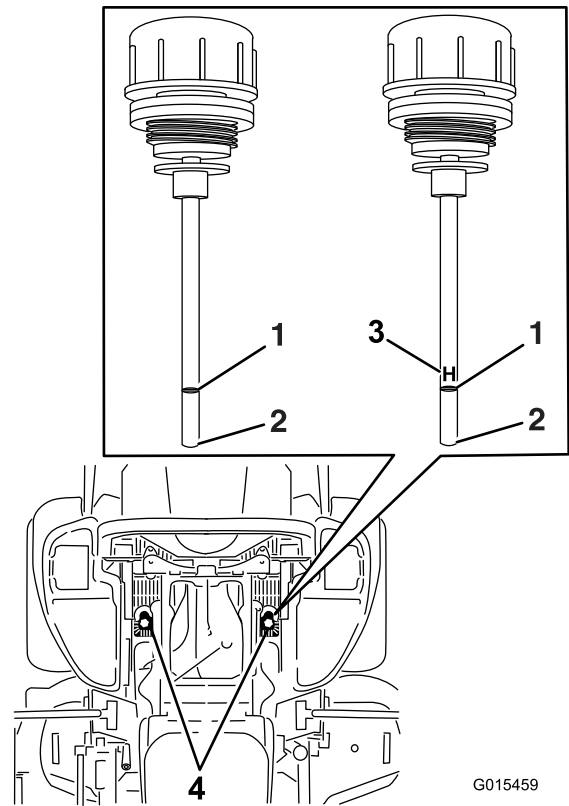
1. Position the machine on a level surface.
2. Disengage the PTO, move the motion-control levers to the NEUTRAL-LOCK position, and set the parking brake.
3. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
4. Allow the engine and the hydraulic system to cool for 10 minutes.

**Note:** The fluid level on the dipstick will be incorrect when you check the fluid and the machine is hot.

5. Move the seat forward.
6. Clean the area around the dipsticks of hydraulic-system reservoirs (Figure 85).
7. Remove one dipstick from the hydraulic reservoir (Figure 85).
8. Wipe the dipstick off and thread the dipstick into the reservoir.
9. Remove the dipstick and look at the end (Figure 85).

**Important:** Do not overfill the hydraulic units with fluid, as damage may occur. Do not run the machine with the fluid below the add mark.

10. If the fluid level is at the ADD mark, slowly pour only enough fluid into the hydraulic reservoir to raise the level to the FULL or H line.
11. Install the dipstick.
12. Repeat the procedure for the opposite dipstick.



G015459

g015459

**Figure 85**

Either dipstick will be used in the machine

- |         |                                  |
|---------|----------------------------------|
| 1. Full | 3. H —means high level           |
| 2. Add  | 4. Dipstick locations under seat |

### **⚠ WARNING**

**Hydraulic fluid escaping under pressure can penetrate skin and cause injury.**

- If hydraulic fluid is injected into the skin it must be surgically removed within a few hours by a doctor familiar with this type of injury. Gangrene may result if this is not done.
- Keep your body and hands away from pinhole leaks or nozzles that eject high-pressure hydraulic fluid.
- Use cardboard or paper to find hydraulic leaks.
- Safely relieve all pressure in the hydraulic system before performing any work on the hydraulic system.
- Ensure that all hydraulic-fluid hoses and lines are in good condition, and that all hydraulic connections and fittings are tight before applying pressure to the hydraulic system.

# Replacing the Hydraulic Filters and Hydraulic Fluid

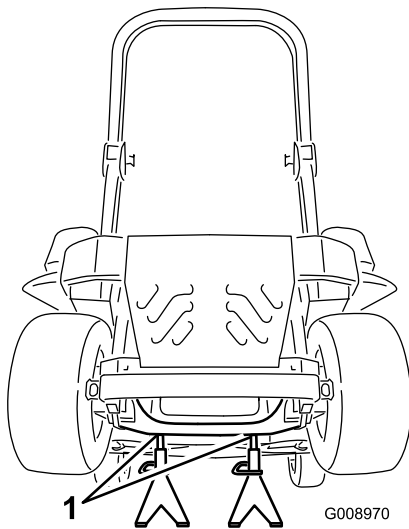
**Service Interval:** After the first 250 hours—Change the hydraulic filters and hydraulic fluid when using any type of fluid.

Every 250 hours—Change the hydraulic filters and hydraulic fluid when using Mobil® 1 fluid (more often in dirty or dusty conditions).

Every 500 hours—Change the hydraulic filters and hydraulic fluid when using Toro® HYPR-OIL™ 500 hydraulic fluid (more often in dirty or dusty conditions).

To replace the hydraulic fluid, the filters need to be removed. Replace both at the same time; refer to [Servicing the Hydraulic System \(page 59\)](#) for the fluid specifications.

1. Disengage the blade-control switch (PTO), move the motion-control levers to the NEUTRAL-LOCK position, and set the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Raise the machine and support it with jack stands ([Figure 86](#)).



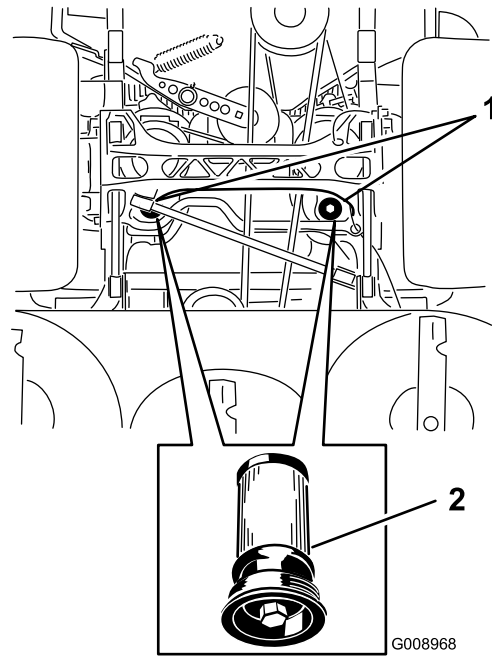
**Figure 86**

1. Jack stands

4. Remove both the mower belt and the pump-drive belt; refer to [Replacing the Mower Belt \(page 54\)](#) and [Replacing the Hydraulic Pump-Drive Belt \(page 55\)](#).

**Note:** This prevents fluid from getting on the belts.

5. Place a drain pan under the filter, remove the old filter, and wipe the surface clean ([Figure 87](#)).



**Figure 87**

Bottom View of Machine

1. Filter locations
2. Hydraulic filter

6. Apply a thin coat of hydraulic fluid to the rubber gasket on the replacement filter ([Figure 87](#)).
7. Install the replacement hydraulic filter.
8. Install the pump-drive belt and the mower belt.
9. Remove the jack stands and lower the machine ([Figure 86](#)).
10. Add fluid to the hydraulic reservoir and check for any leaks.
11. Clean up any spilled fluid.
12. Start the engine and let it run for about 2 minutes to purge air from the system.
13. Shut off the engine and check for leaks.
14. Check the fluid level while the fluid is cold.
15. If required, add fluid to the hydraulic reservoir.

**Note:** Do not overfill.

# Mower Deck Maintenance

## Leveling the Mower Deck

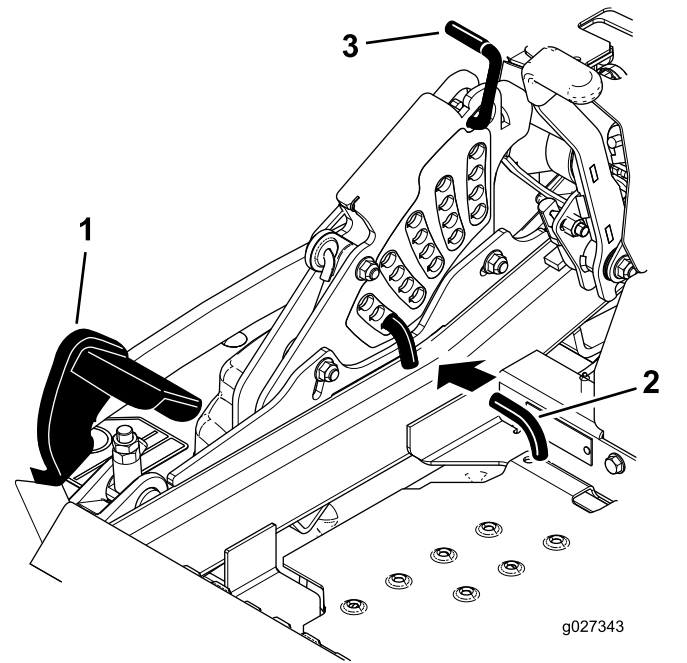
### Setting up the Machine

**Note:** Ensure that the mower deck is leveled before matching the height of cut (HOC).

1. Position the mower on a flat surface.
2. Disengage the blade-control switch (PTO), move the motion-control levers to the NEUTRAL-LOCK position, and set the parking brake.
3. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
4. Check tire pressure of the drive tires.
5. If needed, adjust to 90 kPa (13 psi).
6. Position the mower to the 76 mm (3 inch) height-of-cut position.

### Leveling the Deck

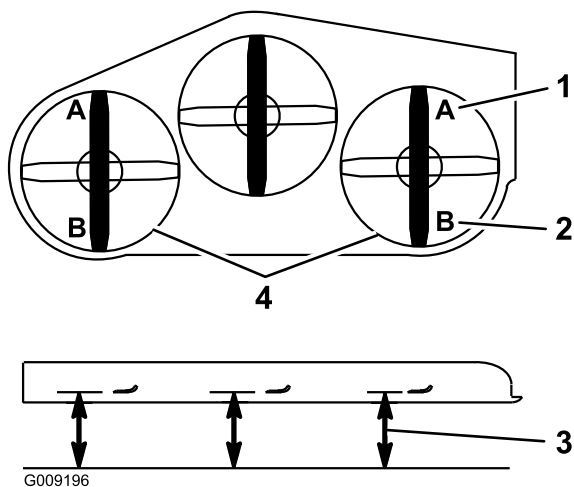
1. Position the mower on a flat surface.
2. Stop engine, wait for all moving parts to stop, remove the key, and engage the parking brake.
3. Check the tire pressure in the drive tires.  
**Note:** Proper inflation pressure for the tires is 90 kPa (13 psi).
4. Position the transport lock in the latching position.
5. Push the deck-lift pedal all the way forward and the deck will latch at the 14 cm (5-1/2 inch) transport position ([Figure 88](#)).



**Figure 88**

- |                      |                   |
|----------------------|-------------------|
| 1. Deck-lift pedal   | 3. Transport lock |
| 2. Height-of-cut pin |                   |
- 
6. Insert the height adjustment pin into the 7.6 cm (3 inches) cutting height location.
  7. Release the transport lock and allow the deck to lower to the cutting height.
  8. Raise the discharge chute.
  9. On both sides of the deck, measure from the level surface to the front tip of the blade (Position A) as shown in [Figure 89](#).

**Note:** The measurement should read 7.6 mm (3 inches)



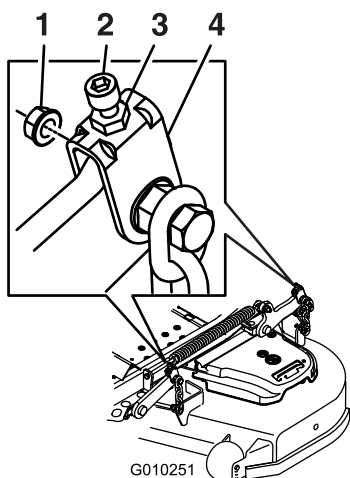
**Figure 89**

1. 7.6 cm (3 inches) at position A is correct
2. 8.3 cm (3-1/4 inches) at position B is correct
3. Measure here from the blade tip to the hard surface
4. Measure at position A and B on both sides

10. If needed, loosen the whizlock nut on the side of the yoke and the jam nut on top (Figure 90).
11. Fine tune the screw adjuster by turning it to get 7.6 mm (3 inches) height.

**Note:** To increase the height, turn the adjuster screw clockwise; to decrease, turn it counterclockwise.

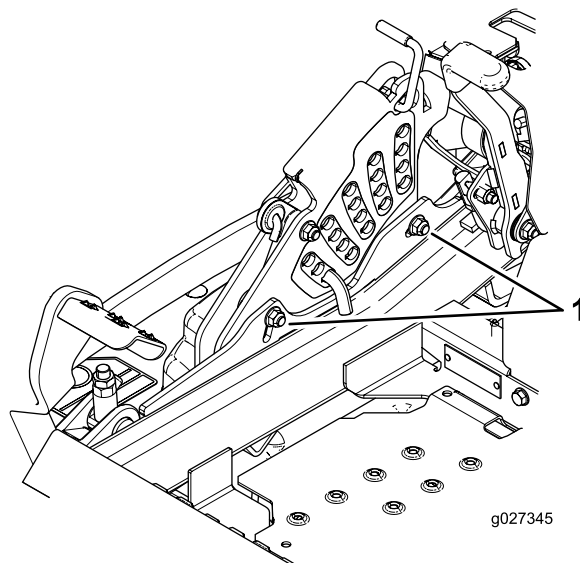
**Note:** If the front deck links do not have enough adjustment to achieve accurate cut height, the single point adjustment can be utilized to gain more adjustment.



**Figure 90**

1. Whizlock nut
2. Adjuster screw
3. Jam nut
4. Yoke

12. To adjust the single-point system, loosen the 2 bolts at the bottom of the height-of-cut plate (Figure 91).

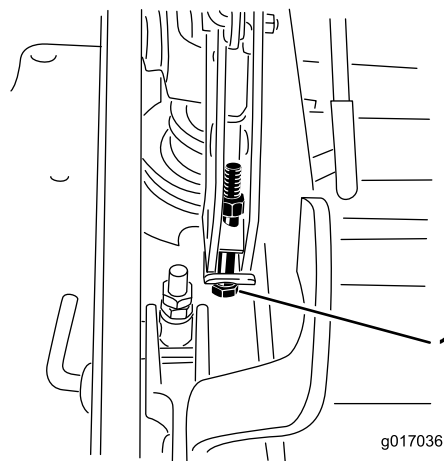


**Figure 91**

1. Bolts at the bottom of the height-of-cut plate

13. If the deck is too low, tighten the single point adjustment bolt by rotating it clockwise. If the deck is too high, loosen the single point adjustment bolt by rotating it counterclockwise (Figure 92).

**Note:** Loosen or tighten the single-point adjustment bolt enough to move the height-of-cut plate mounting bolts at least 1/3 the length of the available travel in their slots. This regains some up and down adjustment on each of the 4 deck links.



**Figure 92**

1. Single-point adjustment bolt

14. Tighten the 2 bolts at the bottom of the height-of-cut plate (Figure 91).



**Note:** In most conditions, the back blade tip should be adjusted 6.4 mm (1/4 inch) higher than the front.

15. Torque the 2 bolts to 37 to 45 N-m (27 to 33 ft-lb).
16. On both sides of the deck, measure from the level surface to the back tip of the blade (position B) as shown in [Figure 89](#).

**Note:** The measurement should read 8.3 cm (3-1/4 inches)

17. Fine tune the screw adjuster by turning it to get 8.3 mm (3-1/4 inch) height ([Figure 90](#)).

To increase the height, turn the adjustment nut clockwise; to decrease it, turn the nut counterclockwise.

18. Measure until all 4 sides are the correct height.
19. Tighten all of the nuts on the deck-lift-arm assemblies.
20. Lower the discharge chute.

## Servicing the Cutting Blades

To ensure a superior quality of cut, keep the blades sharp. For convenient sharpening and replacement, you may want to keep extra blades on hand.

### ⚠ WARNING

**A worn or damaged blade can break, and a piece of the blade could be thrown into the operator's or bystanders' area, resulting in serious personal injury or death.**

- **Inspect the blades periodically for wear or damage.**
- **Replace a worn or damaged blade.**

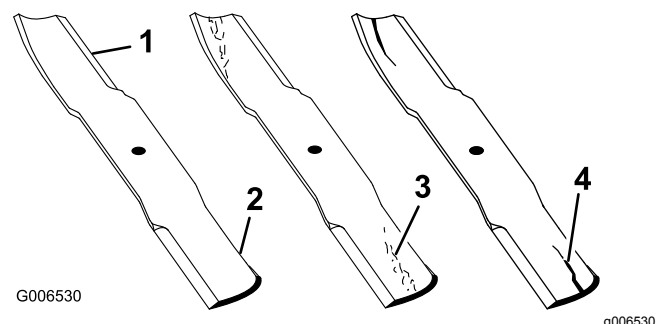
## Before Inspecting or Servicing the Blades

Park the machine on a level surface, disengage the blades and set the parking brake. Turn the ignition key to off. Remove the key and disconnect the spark plug wires from the spark plugs.

## Inspecting the Blades

**Service Interval:** Before each use or daily

1. Inspect the cutting edges ([Figure 93](#)).
2. If the edges are not sharp or have nicks, remove and sharpen the blade; refer to [Sharpening the Blades](#) (page 64).
3. Inspect the blades, especially in the curved area.
4. If you notice any cracks, wear, or a slot forming in this area, immediately install a new blade ([Figure 93](#)).

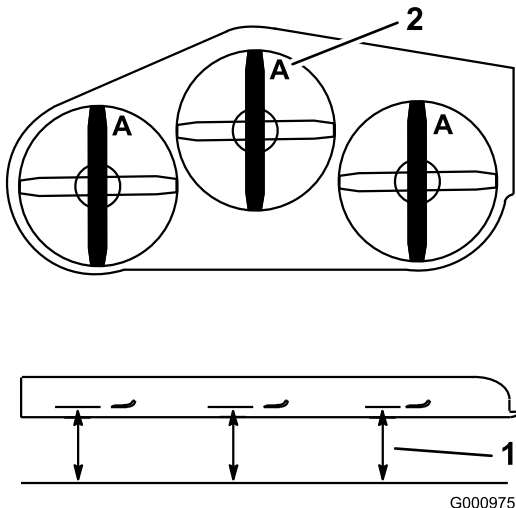


**Figure 93**

- |                 |                      |
|-----------------|----------------------|
| 1. Cutting edge | 3. Wear/slot forming |
| 2. Curved area  | 4. Crack             |

## Checking for Bent Blades

1. Disengage the PTO, move the motion-control levers to the NEUTRAL-LOCK position, and set the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Rotate the blades until the ends face forward and backward.
4. Measure from a level surface to the cutting edge, position **A**, of the blades (**Figure 94**).



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**Figure 94**

1. Measure here from blade to hard surface
2. Position A

5. Rotate the opposite ends of the blades forward.
6. Measure from a level surface to the cutting edge of the blades at the same position as in step 4 above.

**Note:** The difference between the dimensions obtained in steps 4 and 5 must not exceed 3 mm (1/8 inch).

**Note:** If this dimension exceeds 3 mm (1/8 inch), the blade is bent and must be replaced.

### **⚠ WARNING**

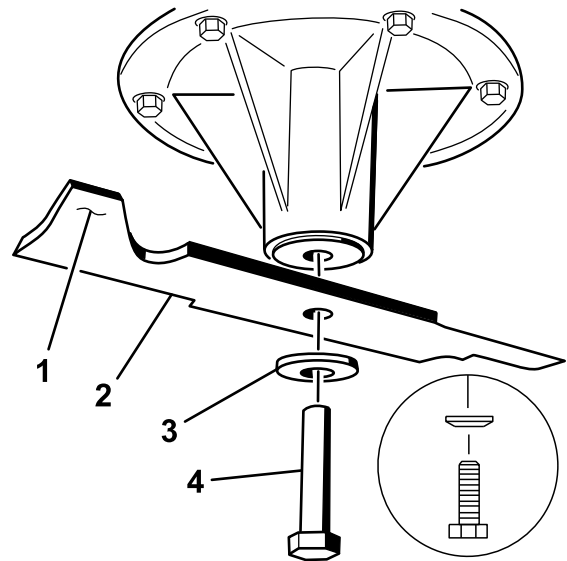
**A blade that is bent or damaged could break apart and could seriously injure or kill you or bystanders.**

- Always replace bent or damaged blade with a new blade.
- Do not file or create sharp notches in the edges or surfaces of the blade.

## Removing the Blades

Blades must be replaced if a solid object is hit, if the blade is out of balance, or if the blade is bent. To ensure optimum performance and continued safety conformance of the machine, use genuine Toro replacement blades. Replacement blades made by other manufacturers may result in nonconformance with safety standards.

1. Hold the blade end using a rag or a thickly-padded glove.
2. Remove the blade bolt, the curved washer, and the blade from the spindle shaft (**Figure 95**).



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g004536

**Figure 95**

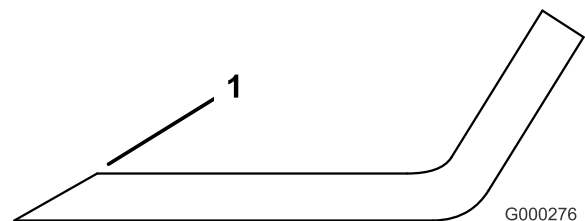
1. Sail area of the blade
2. Blade
3. Curved washer
4. Blade bolt

## Sharpening the Blades

1. Use a file to sharpen the cutting edge at both ends of the blade (**Figure 96**).

**Note:** Maintain the original angle.

**Note:** The blade retains balance if the same amount of material is removed from both cutting edges.



G000276

g000276

**Figure 96**

1. Sharpen at the original angle



2. Check the balance of the blade by putting it on a blade balancer (Figure 97).

**Note:** If the blade stays in a horizontal position, the blade is balanced and can be used.

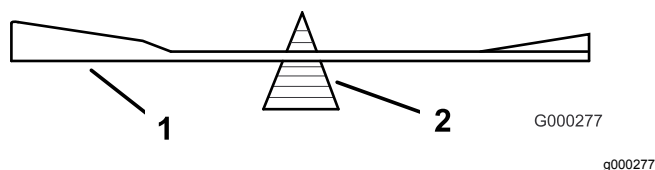


Figure 97

1. Blade
2. Balancer

3. If the blade is not balanced, file some metal off the end of the sail area only (Figure 95).
4. Repeat this procedure until the blade is balanced.

## Installing the Blades

1. Install the blade onto the spindle shaft (Figure 98).

**Important:** The curved part of the blade must be pointing upward toward the inside of the mower to ensure proper cutting.

2. Install the spring disk and blade bolt (Figure 98).

**Note:** The spring-disk cone must be installed toward the bolt head (Figure 98).

3. Torque the blade bolt to 115 to 150 N-m (85 to 110 ft-lb).

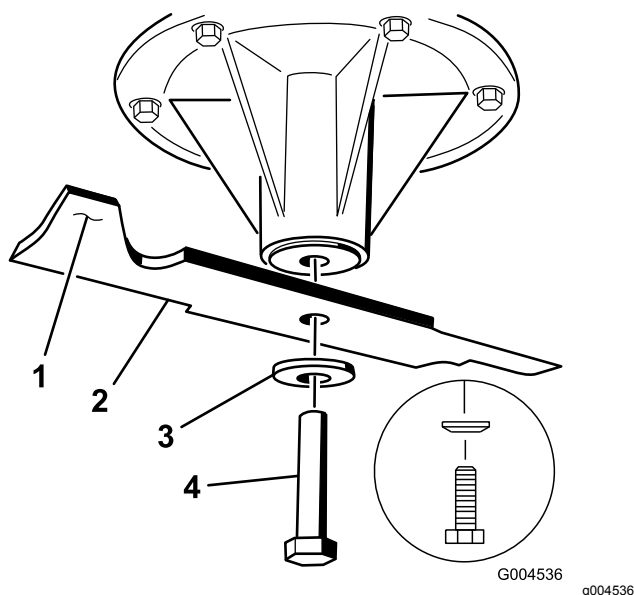


Figure 98

1. Sail area of the blade
2. Blade
3. Spring disk
4. Blade bolt

## Removing the Mower Deck

Before servicing or removing the mower deck, lock out the spring-loaded deck arms.

### ⚠ WARNING

**Deck-lift-arm assemblies have stored energy. Removing the deck without releasing the stored energy can cause serious injury or death.**

**Do not attempt to disassemble the deck from the front frame without locking out the stored energy.**

1. Shut off the engine, wait for all moving parts to stop, remove the key, and engage the parking brake.
2. Remove the height-adjustment pin and lower the deck to the ground.
3. Place the height-adjustment pin in the 7.6 cm (3 inch) cutting-height location.

**Note:** This locks the deck-lift arms in the lowest position when you remove the deck and release the stored energy in the deck spring.

4. Remove the belt covers.
5. Lift up the floor pan and insert a ratchet into the square hole in the deck idler (Figure 99).
6. Rotate the deck idler clockwise and remove the mower belt (Figure 99).

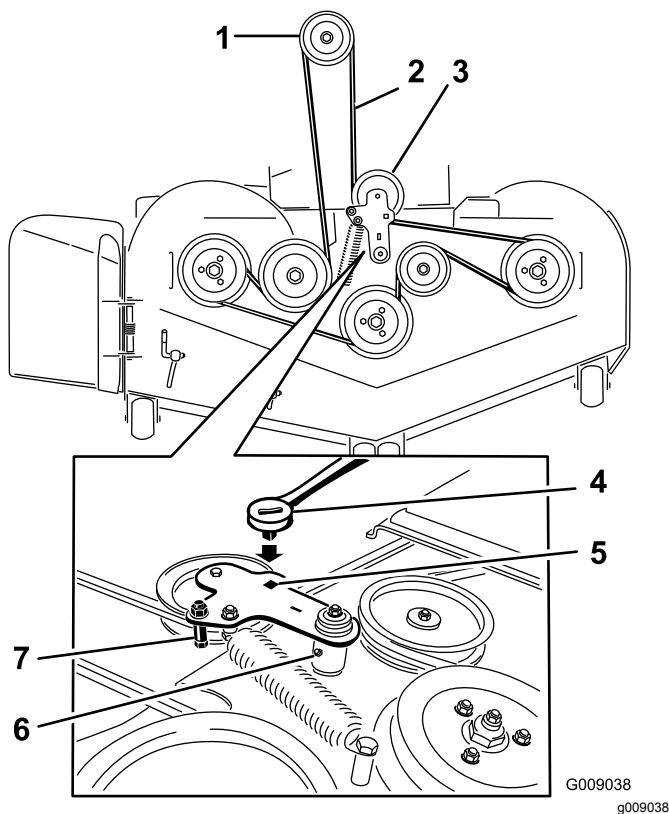


Figure 99

1. Clutch pulley
2. Mower belt
3. Spring-loaded idler pulley
4. Ratchet
5. Square hole in the idler arm for the ratchet
6. Idler grease fitting
7. Belt guide

7. Remove and retain the hardware on both sides of the deck (Figure 100).

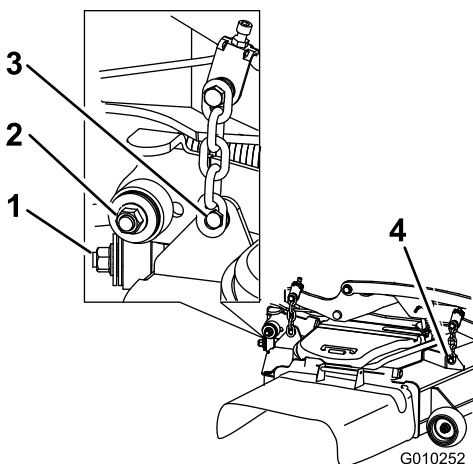


Figure 100

1. Right stabilizer
2. Deck strut (right side shown)
3. Remove the rear deck-lift attachment shoulder bolt and nut.
4. Remove the front deck-lift attachment shoulder bolt and nut.

8. Raise the deck struts and secure them in the up position.
9. Slide the deck out to the right side of the machine.

## Replacing the Grass Deflector

### ⚠ WARNING

An uncovered discharge opening could allow the lawn mower to throw objects at you or bystanders, resulting in serious injury. Also, contact with the blade could occur.

Do not operate the lawn mower unless you install a cover plate, a mulch plate, grass deflector, or bagger.

1. Remove the locknut, the bolt, the spring, and the spacer holding the deflector to the pivot brackets (Figure 101).
2. Remove the damaged or worn grass deflector (Figure 101).

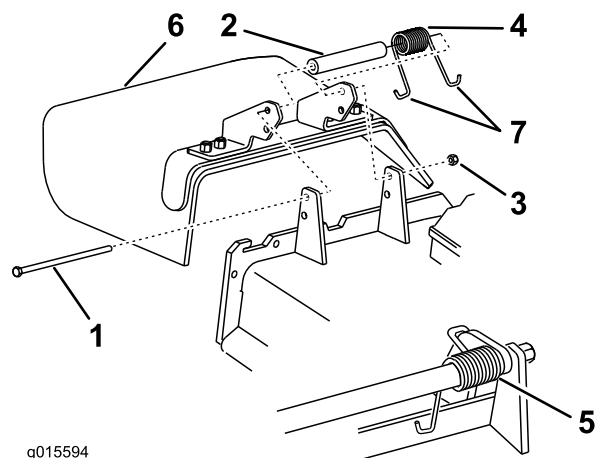


Figure 101

1. Bolt
2. Spacer
3. Locknut
4. Spring
5. Spring installed
6. Grass Deflector
7. J-hook end of spring

3. Place the spacer and the spring onto grass deflector.
4. Place 1 J-hook end of the spring behind the deck edge.

**Note:** Ensure that 1 J-hook end of the spring is installed behind the deck edge before installing the bolt as shown in Figure 101.

5. Install the bolt and the nut.

6. Place 1 J-hook end of the spring around the grass deflector ([Figure 101](#)).

***Important:*** The grass deflector must be able to rotate. Lift the deflector up to the full-open position and ensure that it rotates into the full down position.

## ***Cleaning***

### **Cleaning under the Mower**

**Service Interval:** Before each use or daily

1. Disengage the blade-control switch (PTO), move the motion-control levers to the NEUTRAL-LOCK position, and set the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Raise the mower to the transport position.

### **Disposing of Waste**

Engine oil, batteries, hydraulic fluid, and engine coolant are pollutants to the environment. Dispose of these according to your state and local regulations.

# Storage

## Cleaning and Storing the Machine

1. Disengage the power-take off (blade-control switch (PTO), set the parking brake, and turn the ignition key to the Off position, and remove the key.
2. Remove grass clippings, dirt, and grime from the external parts of the entire machine (especially the engine and hydraulic system). Clean dirt and chaff from the outside of the engine-cylinder-head fins and the blower housing.

**Important:** You can wash the machine with mild detergent and water. Do not pressure wash the machine. Avoid excessive use of water, especially near the control panel, engine, hydraulic pumps, and motors.

3. Check the brake; refer to [Brake Maintenance \(page 53\)](#).
4. Service the air cleaner; refer to [Servicing the Air Cleaner \(page 38\)](#).
5. Grease the machine; refer to [Greasing and Lubrication \(page 36\)](#).
6. Change the crankcase oil; refer to [Changing the Engine Oil \(page 41\)](#).
7. Check the tire pressure; refer to [Checking the Tire Pressure \(page 48\)](#).
8. Change the hydraulic filters; refer to [Replacing the Hydraulic Filters and Hydraulic Fluid \(page 60\)](#).
9. Charge the battery; refer to [Charging the Battery \(page 46\)](#).
10. Scrape any heavy buildup of grass and dirt from the underside of the mower, then wash the mower with a garden hose.

**Note:** Run the machine with the blade-control switch (PTO) engaged and the engine at high idle for 2 to 5 minutes after washing.

11. Check the condition of the blades; refer to [Servicing the Cutting Blades \(page 63\)](#).
12. Prepare the machine for storage when non-use occurs over 30 days. Prepare the machine for storage as follows:
  - A. Add a petroleum based stabilizer/conditioner to fuel in the tank. Follow mixing instructions from the stabilizer manufacturer. Do not use

an alcohol based stabilizer (ethanol or methanol).

**Note:** A fuel stabilizer/conditioner is most effective when mixed with fresh fuel and used at all times.

- B. Run the engine to distribute conditioned fuel through the fuel system (5 minutes).
- C. Shut off the engine, allow it to cool, and drain the fuel tank; refer to [Servicing the Fuel Tank \(page 45\)](#).
- D. Start the engine and run it until it stops.
- E. Dispose of fuel properly. Recycle as per local codes.

**Important:** Do not store stabilizer/conditioned fuel over 90 days.

13. Check and tighten all bolts, nuts, and screws. Repair or replace any part that is damaged.
14. Paint all scratched or bare metal surfaces. Paint is available from your Authorized Service Dealer.
15. Store the machine in a clean, dry garage or storage area. Remove the key from the ignition switch and keep it out of reach of children or other unauthorized users. Cover the machine to protect it and keep it clean.

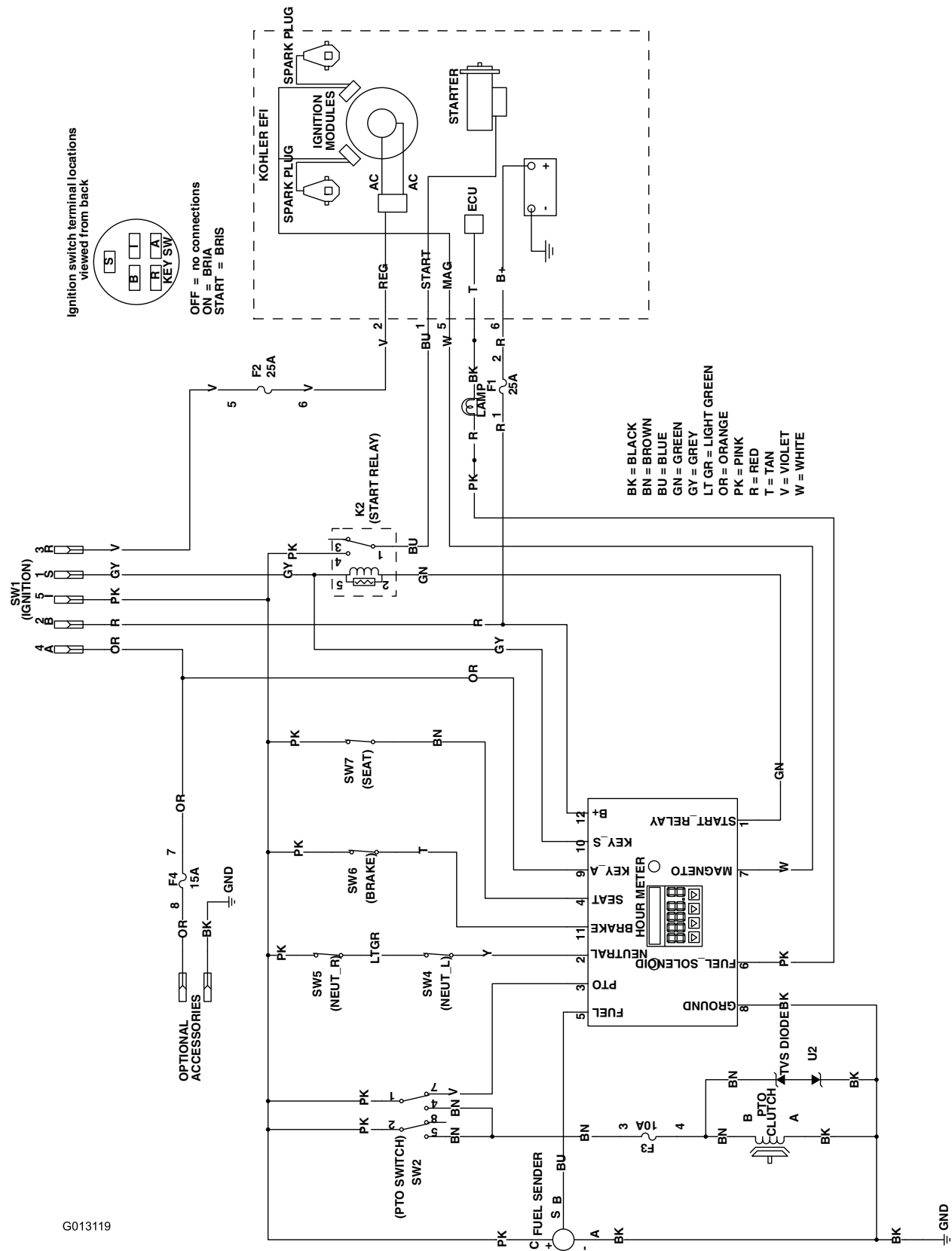
# Troubleshooting

Problem	Possible Cause	Corrective Action
The malfunction-indicator light (MIL) comes on.	<ol style="list-style-type: none"> <li>1. The engine is too hot.</li> <li>2. There is old fuel in the fuel tank.</li> <li>3. The fuel-shutoff valve is not open.</li> <li>4. The air cleaner is dirty.</li> <li>5. The battery is not charged.</li> <li>6. Incorrect fuel filters are being used or the fuel filters are dirty.</li> <li>7. The connections to the sensors electronic control unit (ECU) and fuel injectors are not secured properly.</li> <li>8. There is low voltage from the battery.</li> <li>9. A fuse is blown.</li> </ol>	<ol style="list-style-type: none"> <li>1. Turn the engine off and let it cool.</li> <li>2. Use new fuel.</li> <li>3. Open the fuel-shutoff valve.</li> <li>4. Ensure that the air cleaner and precleaner are clean. Replace them if necessary.</li> <li>5. Charge or replace the battery.</li> <li>6. Contact an Authorized Service Dealer.</li> <li>7. Contact an Authorized Service Dealer.</li> <li>8. Ensure that the machine has a good, fully charged 12 V battery.</li> <li>9. Check and replace the blown fuse.</li> </ol>
The starter does not work.	<ol style="list-style-type: none"> <li>1. The blade-control switch (PTO) is engaged.</li> <li>2. The parking brake is not set.</li> <li>3. The motion-control levers are not in the Neutral-Lock position.</li> <li>4. You are not sitting in the seat.</li> <li>5. The battery is dead.</li> <li>6. The electrical connections are corroded or loose.</li> <li>7. The fuse is blown.</li> <li>8. The relay or switch is worn or damaged.</li> </ol>	<ol style="list-style-type: none"> <li>1. Move the blade-control switch (PTO) to the disengaged position.</li> <li>2. Set the parking brake.</li> <li>3. Ensure that the motion-control levers are in the Neutral-Lock position.</li> <li>4. Sit on the seat.</li> <li>5. Charge or replace the battery.</li> <li>6. Check the electrical connections for good contact.</li> <li>7. Replace the fuse.</li> <li>8. Contact an Authorized Service Dealer.</li> </ol>
The engine does not start, starts hard, or fails to keep running.	<ol style="list-style-type: none"> <li>1. The fuel tank is empty.</li> <li>2. The fuel-shutoff valve is closed.</li> <li>3. The oil level in the crankcase is low.</li> <li>4. The throttle is not in the correct position.</li> <li>5. There is dirt in the fuel filter.</li> <li>6. There is dirt, water, or stale fuel in the fuel system.</li> <li>7. The air cleaner is dirty.</li> <li>8. The seat switch is not functioning properly.</li> <li>9. The electrical connections are corroded, loose, or damaged.</li> <li>10. The relay or switch is worn or damaged.</li> <li>11. The spark plug is fouled or improperly gapped.</li> <li>12. The spark-plug wire is not connected.</li> </ol>	<ol style="list-style-type: none"> <li>1. Fill the fuel tank.</li> <li>2. Open the fuel-shutoff valve.</li> <li>3. Add oil to the crankcase.</li> <li>4. Be sure that the throttle control is midway between the Slow and Fast positions.</li> <li>5. Replace the fuel filter.</li> <li>6. Contact an Authorized Service Dealer.</li> <li>7. Clean or replace the air-cleaner element.</li> <li>8. Check the seat-switch indicator. Replace the seat if necessary.</li> <li>9. Check the electrical connections for good contact. Clean the connector terminals thoroughly with electrical-contact cleaner, apply dielectric grease, and make the appropriate connections.</li> <li>10. Contact an Authorized Service Dealer.</li> <li>11. Adjust or replace the spark plug.</li> <li>12. Check the spark-plug wire connection.</li> </ol>

<b>Problem</b>	<b>Possible Cause</b>	<b>Corrective Action</b>
The engine loses power.	<ol style="list-style-type: none"> <li>1. The engine load is excessive.</li> <li>2. The air cleaner is dirty.</li> <li>3. The oil level in the crankcase is low.</li> <li>4. The cooling fins and the air passages above the engine are plugged.</li> <li>5. The vent hole in the fuel cap is plugged.</li> <li>6. There is dirt in the fuel filter.</li> <li>7. There is dirt, water, or stale fuel in the fuel system.</li> </ol>	<ol style="list-style-type: none"> <li>1. Reduce the ground speed.</li> <li>2. Clean the air-cleaner element.</li> <li>3. Add oil to the crankcase.</li> <li>4. Remove the obstruction from the cooling fins and the air passages.</li> <li>5. Clean or replace the fuel cap.</li> <li>6. Replace the fuel filter.</li> <li>7. Contact an Authorized Service Dealer.</li> </ol>
The engine overheats.	<ol style="list-style-type: none"> <li>1. The engine load is excessive.</li> <li>2. The oil level in the crankcase is low.</li> <li>3. The cooling fins and the air passages above the engine are plugged.</li> </ol>	<ol style="list-style-type: none"> <li>1. Reduce the ground speed.</li> <li>2. Add oil to the crankcase.</li> <li>3. Remove the obstruction from the cooling fins and the air passages.</li> </ol>
The mower pulls to the left or right (with levers fully forward)	<ol style="list-style-type: none"> <li>1. The tracking needs adjustment</li> <li>2. The tire pressure in the drive tires is not correct.</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust the tracking.</li> <li>2. Adjust the tire pressure in the drive tires.</li> </ol>
The machine does not drive.	<ol style="list-style-type: none"> <li>1. The bypass valves are not closed tight.</li> <li>2. The pump belt is worn, loose, or broken.</li> <li>3. The pump belt is off a pulley.</li> <li>4. The idler spring is broken or missing.</li> <li>5. The hydraulic oil level is low or too hot.</li> </ol>	<ol style="list-style-type: none"> <li>1. Tighten the bypass valves.</li> <li>2. Change the belt.</li> <li>3. Change the belt.</li> <li>4. Replace the spring.</li> <li>5. Add hydraulic oil to the reservoirs or let it cool down.</li> </ol>
The machine vibrates abnormally.	<ol style="list-style-type: none"> <li>1. The cutting blade(s) is/are bent or unbalanced.</li> <li>2. The blade mounting bolt is loose.</li> <li>3. The engine mounting bolts are loose.</li> <li>4. The engine pulley, idler pulley, or blade pulley is loose.</li> <li>5. The engine pulley is damaged.</li> <li>6. The blade spindle is bent.</li> <li>7. The motor mount is loose or worn.</li> </ol>	<ol style="list-style-type: none"> <li>1. Install new cutting blade(s).</li> <li>2. Tighten the blade mounting bolt.</li> <li>3. Tighten the engine mounting bolts.</li> <li>4. Tighten the appropriate pulley.</li> <li>5. Contact an Authorized Service Dealer.</li> <li>6. Contact an Authorized Service Dealer.</li> <li>7. Contact an Authorized Service Dealer.</li> </ol>
The machine produces an uneven cutting height.	<ol style="list-style-type: none"> <li>1. The blade(s) is/are not sharp.</li> <li>2. The cutting blade(s) is/are bent.</li> <li>3. The mower deck is not level.</li> <li>4. The underside of mower is dirty.</li> <li>5. The tire pressure is not correct.</li> <li>6. The blade spindle is bent.</li> </ol>	<ol style="list-style-type: none"> <li>1. Sharpen the blade(s).</li> <li>2. Install new cutting blade(s).</li> <li>3. Level the mower deck from side-to-side and front-to-rear.</li> <li>4. Clean the underside of the mower.</li> <li>5. Adjust the tire pressure.</li> <li>6. Contact an Authorized Service Dealer.</li> </ol>
The blades do not rotate.	<ol style="list-style-type: none"> <li>1. The mower deck belt is worn, loose, or broken.</li> <li>2. The mower deck belt is off pulley.</li> <li>3. The pump drive belt is worn, loose, or broken.</li> <li>4. The idler spring is broken or missing.</li> </ol>	<ol style="list-style-type: none"> <li>1. Install a new deck belt.</li> <li>2. Install the mower deck pulley and check the idler pulley, idler arm, and spring for correct position and function.</li> <li>3. Check the belt tension or install a new belt.</li> <li>4. Replace the spring.</li> </ol>

Problem	Possible Cause	Corrective Action
The clutch does not engage.	<ol style="list-style-type: none"> <li>1. The fuse is blown.</li> <li>2. There is low voltage supply at the clutch.</li> <li>3. The coil is damaged.</li> <li>4. There is inadequate current supply.</li> <li>5. The rotor/armature air gap is too large.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace the fuse. Check the coil resistance, battery charge, charging system, and wiring connections, and replace components if necessary.</li> <li>2. Check the coil resistance, battery charge, charging system, and wiring connections and replace parts if necessary.</li> <li>3. Replace the clutch.</li> <li>4. Repair or replace the clutch lead wire or electrical system. Clean the connector contacts.</li> <li>5. Remove the shim or replace the clutch.</li> </ol>

# Schematics



### Wire Diagram (Rev. A)



**Notes:**

**Notes:**

**Notes:**



# The Toro Warranty

A Limited Warranty (see warranty periods below)

Landscape  
Contractor  
Equipment  
(LCE)

## Conditions and Products Covered

The Toro Company and its affiliate, Toro Warranty Company, pursuant to an agreement between them, jointly promise to the original purchaser to repair the Toro Products listed below if defective in materials or workmanship.

The following time periods apply from the date of purchase:

Products	Warranty Period
21 in. Mowers	2 years Residential Use <sup>1</sup> 1 year Commercial Use
• Engines <sup>3</sup>	Honda – 2 years Kawasaki – 3 years
30 in. Mowers	2 years Residential Use <sup>1</sup> 1 year Commercial Use
• Engines <sup>3</sup>	Kawasaki – 3 years
Mid-Size Walk-Behind Mowers	2 years
• Engines <sup>3</sup>	Kawasaki – 3 years
Grand Stand® Mowers	5 years or 1,200 hours <sup>2</sup>
• Engines <sup>3</sup>	3 years
Z Master® 2000 Series Mowers	4 years or 500 hours <sup>2</sup>
• Engines <sup>3</sup>	3 years
Z Master® 3000 Series Mowers	5 years or 1,200 hours <sup>2</sup>
• Engines <sup>3</sup>	3 years
Z Master® 5000 Series Mowers	5 years or 1,200 hours <sup>2</sup>
• Engines <sup>3</sup>	Kohler Command – 2 years Kohler EFI – 3 years
Z Master® 6000 Series Mowers	5 years or 1,200 hours <sup>2</sup>
• Engines <sup>3</sup>	Kawasaki – 3 years
Z Master® 7000 Series Mowers	5 years or 1,200 hours <sup>2</sup>
• Engines <sup>3</sup>	2 years
Z Master® 8000 Series Mowers	2 years or 1,200 hours <sup>2</sup>
• Engines <sup>3</sup>	2 years
All Mowers	
• Battery	90 days Parts and Labor 1 year Parts only
• Belts and Tires	90 days
• Attachments	1 year

<sup>1</sup>Residential use means use of the product on the same lot as your home. Use at more than one location is considered commercial use and the commercial warranty would apply.

<sup>2</sup>Whichever occurs first.

<sup>3</sup>Some engines used on Toro Products are warranted by the engine manufacturer.

## Instructions for Obtaining Warranty Service

If you think that your Toro Product contains a defect in materials or workmanship, follow this procedure:

1. Contact any Authorized Toro Service Dealer to arrange service at their dealership. To locate a dealer convenient to you, access our web site at [www.Toro.com](http://www.Toro.com). You may also call the numbers listed in item #3 to use the 24-hour Toro Dealer locator system.
2. Bring the product and your proof of purchase (sales receipt) to the Service Dealer. The dealer will diagnose the problem and determine if it is covered under warranty.
3. If for any reason you are dissatisfied with the Service Dealer's analysis or with the assistance provided, contact us at:

Toro Warranty Company  
8111 Lyndale Avenue South  
Bloomington, MN 55420-1196  
888-865-5676 (U.S. Customers)  
888-865-5691 (Canada customers)

## Owner Responsibilities

You must maintain your Toro Product by following the maintenance procedures described in the *Operator's Manual*. Such routine maintenance, whether performed by a dealer or by you, is at your expense.

## Items and Conditions Not Covered

There is no other express warranty except for special emission system coverage and engine warranty coverage on some products. This express warranty does not cover the following:

- Cost of regular maintenance service or parts, such as filters, fuel, lubricants, oil changes, spark plugs, air filters blade sharpening or worn blades, cable/linkage adjustments, or brake and clutch adjustments
- Components failing due to normal wear
- Any product or part which has been altered or misused or neglected or requires replacement or repair due to accidents or lack of proper maintenance
- Pickup and delivery charges
- Repairs or attempted repairs by anyone other than an Authorized Toro Service Dealer
- Repairs necessary due to failure to follow recommended fuel procedure (consult *Operator's Manual* for more details)
  - Removing contaminants from the fuel system is not covered
  - Use of old fuel (more than one month old) or fuel which contains more than 10% ethanol or more than 15% MTBE
  - Failure to drain the fuel system prior to any period of non-use over one month

## General Conditions

All repairs covered by these warranties must be performed by an Authorized Toro Service Dealer using Toro approved replacement parts.

**Neither The Toro Company nor Toro Warranty Company is liable for indirect, incidental or consequential damages in connection with the use of the Toro Products covered by this warranty, including any cost or expense of providing substitute equipment or service during reasonable periods of malfunction or non-use pending completion of repairs under this warranty.**

**All implied warranties of merchantability (that the product is fit for ordinary use) and fitness for use (that the product is fit for a particular purpose) are limited to the duration of the express warranty.**

**Some states do not allow exclusions of incidental or consequential damages, or limitations on how long an implied warranty lasts, so the above exclusions and limitations may not apply to you.**

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

## Countries Other than the United States or Canada

Customers who have purchased Toro products outside the United States or Canada should contact their Toro Distributor (Dealer) to obtain guarantee policies for your country, province, or state. If for any reason you are dissatisfied with your Distributor's service or have difficulty obtaining guarantee information, contact the Toro importer. If all other remedies fail, you may contact us at Toro Warranty Company.

**Australian Consumer Law:** Australian customers will find details relating to the Australian Consumer Law either inside the box or at your local Toro Dealer.